

#624

HEAO-1

SKYMAP DISPLAY FILES

REDUCED DATA BASE,.MH & .FB FILE

77-075A-04B

77-075A-04C

HEAO-1

Skymap Display Files

77-075A-04B

This data set has been restored. There were originally 2 9-track, 1600 BPI tapes written in Binary. There is one restored tape. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The tapes were created on a 830 computer. The DR and DS numbers along with the corresponding D numbers and the time spans are as follows:

DR#	DS#	DD#	FILES	TIME SPAN
DR03702	DS03702	D59746 D59747	1-6 7-10	08/21/77 - 01/08/79 08/21/77 - 01/08/79

HEAO-1

REDUCED DATA BASE, .MH & .FB FILE

77-075A-04C

This data set has been restored. There were originally 4 9-track, 1600 BPI tapes written in Binary. There is one restored tape. The DR tape is a 3480 cartridge and the DS tape is 9-track, 6250 BPI. The tapes were created on a 830 computer. The DR and DS numbers along with the corresponding D numbers and the time spans are as follows:

DR#	DS#	DD#	FILES	TIME SPAN
DR03703	DS03703	D59748	1-6	08/21/77 - 02/22/78
		D59749	7-12	02/09/78 - 09/02/78
		D59750	13-16	08/14/78 - 01/08/79
		D59751	17-32	08/21/77 - 01/08/79

REQ. AGENT
DAD

RAND #
V0226

ACQ. AGENT
HKH

HEAD-1

SKYMAP DISPLAY FILES

77-075A-04B

THIS DATA SET CONSISTS OF 2 TAPES. THE TAPES ARE MULTIFILED, 9-TRACK,
1600 BPI, BINARY, AND WERE CREATED ON A DATA GENERAL NOVA 830 COMPUTER.
THE D#, C#, # OF FILES AND TIME SPANS FOLLOW BELOW:

<u>D#</u>	<u>C#</u>	<u># OF FILES</u>	<u>TIME SPAN</u>
D-59746	C-23648	6	08/21/77 - 01/08/79
D-59747	C-23649	4	08/21/77 - 01/08/79

HEAD-1

REDUCED DATA BASE, .MH & .FB FILE

77-075A-04C

THIS DATA SET CONSISTS OF 4 TAPES. THE TAPES ARE MULTIFILED, 9TRACK,
1600 BPI, BINARY, AND WERE CREATED ON A DATA GENERAL NOVA 830 COMPUTER.
THE D#, C#, #OF FILES AND TIME SPANS FOLLOW BELOW:

<u>D#</u>	<u>C#</u>	<u># OF FILES</u>	<u>TIME SPAN</u>
D-59748	C-23644	6	08/21/77 - 02/22/78
D-59749	C-23645	6	02/09/78 - 09/02/78
D-59750	C-23646	4	08/14/78 - 01/08/79
D-59751	C-23647	16	08/21/77 - 01/08/79

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CENTER FOR SPACE RESEARCH
CAMBRIDGE, MASSACHUSETTS 02139

October 28, 1983

Mr. Ralph Post
National Space Science Data Center
Code 601
Goddard Space Flight Center
Greenbelt, MD 20771

Dear Mr. Post:

In response to your request, I have enclosed a table which summarizes the time intervals during which the data found on the HEAO-1 (A4) tapes were taken. For tapes "E" and "F" the epoch code is part of the name of each disk file and can be used with the enclosed table to obtain the dates during which the data was taken.

Please feel free to call again if you have any more questions. My phone number is 617-253-7525.

Yours,



Alan M. Levine

AML:seb

Enclosure

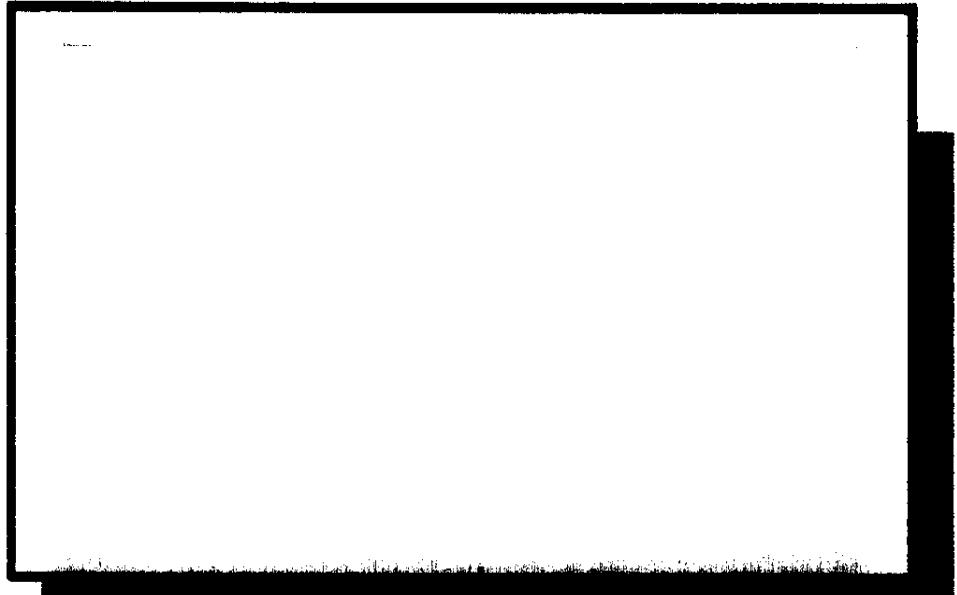
Time intervals during which HEAO-1 (A4) data were taken. 77-075A-04C

Tape:		Begin Time			End time		
Tape files	Disk file	YR	MO	DA	HR	MN	SC
A:0,1;D:0,1	MQ1501499-	77	8	21	23	4	29
A:2,3;D:2,3	M10002499-	77	10	15	22	33	13
A:4,5;D:4,5	M15002599-	77	11	17	6	21	33
B:0,1;D:6,7	M26003999-	78	2	9	5	59	0
B:2,3;D:8,9	M36005199-	78	4	14	16	29	49
B:4,5;D:10,11	M46005599-	78	5	24	9	40	36
C:0,1;D:12,13	M57006599-	78	8	14	18	34	52
C:2,3;D:14,15	M66007999-	78	10	11	10	59	38
					77	11	17
						6	21
						3	33

For tapes E and F, the epoch code (1,2,3, or T) gives the time interval of each disk file as follows: 77-075A-04B

EPOCH CODE	Begin date	End date
	YR/MO/DA	YR/MO/DA
1	77 8 21	78 3 1
2	78 2 3	78 3 2
3	78 8 7	79 1 6
T	77 8 21	79 1 6

B352C 3-000A



MASSACHUSETTS

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MIT Center for Space Research

Documentation of Data from the
HEAO-1 A4 Experiment

Submitted to the

National Space Science Data Center

July 1983

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1.0 Introduction

This document supports the initial submittal of HEAO-1 (A4) High-Energy X-Ray Sky Survey Data to the National Space Science Data Center (NSSDC). This submittal also includes a set of magnetic tapes containing the reduced data which form the base for the construction of the high-energy X-ray sky survey catalog. The data were obtained from the Low Energy Detectors (LEDs) of the Hard X-Ray and Low-Energy Gamma-Ray Instrument (A4) which has been described by Matteson (1978). Further information on the detection system and its calibration is contained in Appendix A.

1.1 Binning Geometry

The data, which was all obtained when the satellite was spinning, consists of event counts and detector livetimes for four broad energy channels for each of the two LEDs, and have been accumulated as a function of satellite orientation. All satellite orientations, which may occur during spinning, can be described by two coordinates, the ecliptic longitude of the spacecraft spin axis (i.e., the z-axis), and the azimuth of the spacecraft y-axis (i.e., the direction of the centers of the fields of view of the LEDs). These coordinates are illustrated in Figure 1. The North Ecliptic Pole defines the origin of the azimuth coordinate, which increases according to the right-hand rule relative to the spacecraft z-axis.

All possible spinning satellite orientations are included in the azimuth range 0° - 360° and the spin-axis longitude range of 0° - 360° . If the satellite orientation is defined by (θ, ϕ) as in Figure 1 then (θ, ϕ) and $(\theta - 180^{\circ}, 360^{\circ} - \phi)$ give identical collimator transmission patterns on the sky, assuming the collimator transmission is invariant to a 180° rotation around the spacecraft

y-axis. This was not always the case for detector D6, since there were occasions when it was partially occulted by the experiment blocking crystal (see Appendix A). Hence, if θ is in the range $180^\circ - 360^\circ$, as would normally occur from 21 September to 21 March, the coordinates are transformed, by the above formula, to give a value of θ in the range $0^\circ - 180^\circ$.

Any data obtained when the spin-axis was more than 0.5° from the ecliptic plane, or when the spacecraft was not spinning, were excluded from the data base.

Data was binned according to the above two-dimensional coordinate scheme. The azimuth coordinate was divided into 900 0.4° bins; the spin-axis ecliptic longitude coordinate was divided into 225 0.8° bins. Data was thereby accumulated in a total of $225 \times 900 = 202,500$ bins. The algorithms for determining bin numbers are:

$$\text{ILONG} = \text{INT} (\theta/0.8^\circ) \quad 0 \leq \text{ILONG} \leq 224$$

$$\text{IAZ} = \text{INT} (\phi/0.4^\circ) \quad 0 \leq \text{IAZ} \leq 899$$

where INT is the function which gives the integral part of the argument.

For this analysis, the ecliptic pole celestial coordinates were taken to be $\alpha(1950) = 270.00^\circ$, $\delta(1950) = 66.50^\circ$ and the x-axis of the ecliptic coordinate system was defined to be coincident with the celestial x-axis ($\alpha=0.0$, $\delta=0.0$).

2.0 Types of Data Files

Three basic sets of data files are included in this submission. They are:

- 1) .MH Files
- 2) .FB Files
- 3) Skymap display files (.F3 or .F6 files)

2.1 .MH Files

Data from a fixed range of sequence numbers (i.e., satellite orbits) is binned and accumulated in a .MH file. Each of these files is named MQaaaabbbb.MH where aaaa (or aaa) is the sequence number of the first orbit of data and bbbb is the sequence number of the last orbit of data included in the file. The files are organized as GRD files (see Section 3.5 and Appendix E). Each data record (type code 10051) contains the data accumulated in one satellite orientation bin and is uniquely specified by the integer pair ILONG,IAZ. These records are sorted so that the value of $900 * \text{ILONG} + \text{IAZ}$ increases. Records do not exist for those orientation bins in which no data was accumulated. Each data record also contains, for each of the two LEDs, the raw number of events and the total livetime.

The .MH files cover overlapping sequence number ranges so that the data in each file is not necessarily independent of the data in all other .MH files. One can, however, obtain a complete, nonrepetitive set of data by selecting data according to the value of ILONG in each file. For example, data from sequence numbers 1500-2499 is in both the MQ10002499.MH and MQ15002999.MH files. If one uses data from bins with $0 \leq \text{ILONG} \leq 100$ from MQ10002499.MH and data from bins with $101 \leq \text{ILONG} \leq 224$ from MQ15002999.MH, then the data obtained will form an independent set.

The types of GRD records contained in these files are documented in Table 2.1. The order that the records appear in the file is the same order as is illustrated in Figure 2.1.

TABLE 2.1: GRD Record Types in MQ-MH Files

Record Type	Type Code	Length	Word Number	Data Type*	Content
Header	0	8	1	I I	File type (=10002)
			2		Not used
			3-5		Hours, minutes, seconds of file creation time
			6-8		Month, day, year of file creation date
Trailer	1	0			
Map Constants	10006	20	1	I I	Number of azimuth bins (=900)
			2	I I	Number of ecliptic longitude bins (=225)
			3-20	9 F	Rotation matrix to convert celestial coordinates to ecliptic coordinates.
Energy Channel Definitions	10015	142	1	I I	Number of channel definitions (=10)
			2	I I	Number of collimators (=2)
			3-16	4 I, S(10)	0, C1, C2, NDET where C1 and C2 are the beginning and end channel numbers of this broad pulse-height channel and NDET is the detector number (3 or 6). These 4 integers are followed by 10 words containing a string of up to 20 characters describing the defined channel.
				"	Same as words 3-16
			17-30	4 I, S(10)	"
			129-142	4 I, S(10)	"
Flag Words	10040	4	1-4		Not used
Data Record	10051	23	1	I I	ILONG
			2	I I	IAZ (records are ordered so that this index varies most rapidly)
			3		Not used
			4-23	10 F	Data: detector D3 - channel A counts
					B
					C
					D
					Live time (seconds)
Creation Time	10098	7	1	I I	Sequence number
			2-4	3 I	processing time for the data from the above sequence number.
			5-7	3 I	processing date.
					D
					Live time (seconds)

* I = integer (1 word)
F = single precision floating point (2 words)
S(n) = ASCII string (number of reserved words)

2.2 .FB Files

Estimates of the background component of the count rate data in the .MH files are parameterized in the .FB files. Each of the .FB files contains the parameters for both LEDs for one broad energy channel. The file names are of the form MaaaabbbbX.FB where aaaa is the beginning sequence number, bbbb is the end sequence number, and X is the energy channel code.

The background is independently parameterized for all data with a given value of ILONG from a given detector. The data from one detector for one value of ILONG consists of counts and livetimes for each of up to 900 azimuth bins. The count rates determined from these data were fit using Fourier transforms so as to determine the coefficients of the first ten terms (i.e., covering the five lowest spatial frequencies) in the Fourier expansion of the data.

Each .FB file is a sequential list of coefficients (see Figure 2.2). The length of each file is 18,000 bytes.

The details of the algorithm for reconstructing estimates of the background count rates from the coefficients in the .FB files are given in Appendix B.

2.3 Skymap Display Files

The skymap display files contain background subtracted count rates which are used to construct visual displays. The files are named Mab.Fc where a is the epoch code (i.e., 1,2,3 or T), b is the energy range code (i.e., A-F or L), and c is the detector number (i.e., 3 or 6). Each file contains roughly six months of data. The files with epoch code 1 cover the first six months of the mission, epoch code 2 stands for the second six months, and epoch 3 stands

for the remainder, i.e., ~5 months, of the mission. The epoch code "T" stands for the total and indicates that the data is the superposition of data from all three epochs.

The count rate data in these files is encoded in integer form according to:

$$j_R = 100 + 10R$$

where R is the count rate in counts/s. For bins where the livetime was zero, a value R = 0 was taken. The exposure files (energy range code L) contain integers which are the exposure times in tenths of seconds.

Each skymap display file is organized as shown in Figure 2.3. Note that the files cover ILONG ranges which extend outside the 0-224 range of binning. Data at ILONG = X is equivalent to data with ILONG = X-225 and with the sense of IAZ reversed (see Section 1.1).

The count rate data in the skymap display files has been smoothed so as to reduce the high frequency spatial noise. The smoothing function used for this purpose is defined in Appendix C. The livetime data in the exposure files has been left unsmoothed.

We note that the background count rate estimates have been revised slightly since the skymap display files were constructed. These latest background estimates were used in the sky survey analysis and are incorporated in the -.FB files. The differences between the version of the background count rate estimates used to make the skymap display files and the version recorded in the -.FB files are negligible for the purpose of visual display of the data.

3.0 Format and Description of Magnetic Tapes

3.1 Physical Description

Data tapes submitted by the MIT X-Ray Astronomy Group are standard 2400 ft, 9 track, 1600 bpi, ANSI compatible Phase Encoded tapes. The magnetic tapes are written by a Data General Nova 830 on a DG6026 dual density magnetic tape transport. The standard word length is two 8-bit bytes.

3.2 Numeric and Character Representation

The data on the magnetic tapes is either of integer, single precision floating point, double precision floating point, or character type. Appendix D, which is reproduced from Appendix E of Part II of the Data General FORTRAN IV user's manual, describes the internal representation of these data types. The representation of floating point numbers is the same as that used in IBM computers. Note also that disk file names are not null terminated.

3.3 File Organization of Data Tapes

Each magnetic tape contains a number of tape files, each of which contains one or more disk files. The organization of the magnetic tape is shown in Figure 3.1. We have chosen to duplicate the tape files so that the content of tape file 1 is identical to that of the tape file 0, the contents of tape files 2 and 3 are identical, and so on. This provides redundancy in case of parity errors in one tape file.

The tapes and the disk files which they contain are listed in Tables 3.1-3.3.

3.4 Tape File Contents

Tapes contain variable length blocks (physical records) whose length may be from 2-4096 words.

The blocks each begin with a GDUMP record and will usually contain additional words after the GDUMP record. The format of a GDUMP record is [Type Code, Record Length, Contents]. GDUMP Type Codes are single word integers and are described in Appendix E. The GDUMP Record Length is also a single word integer and it contains the length, in words, of the following GDUMP record contents. Therefore, the GDUMP Record Length does not include the two words used for the Type Code and Record Length.

GDUMP records are used to write disk files onto magnetic tape (see Figure 3.2). GDUMP record type -3 contains the information about a disk file which is given by the User File Description (UFD). The Data General documentation of the UFD is reproduced in Appendix F. This type code is found at the beginning of the tape dump of a disk file. The remainder of the block contains the first portion of the disk file. GDUMP Type Code -2 serves to mark a block as the continuation of the disk file which was written in the previous block. GDUMP Type Code -4 marks the remainder of the tape file as bad data. GDUMP Type Codes -12 and -13 are used in the double dumps of a disk file and are analogous to GDUMP Type Codes -2 and -3.

3.5 GRD Type Disk Files

Disk files may be organized into logical records which are called GRD (General Read) records. GRD records have a structure which is the same as that of a GDUMP record, namely [Type Code, Record Length, Contents]. Figure 3.3 illustrates the organization of a GRD disk file written on magnetic tape.

Table 3.1Magnetic Tape File List 1

<u>Tape Name</u>	<u>Tape File Number</u>	<u>Content (Disk Files)</u>
A	0	MQ1501499.MH
	1	"
	2	M10002499.MH
	3	"
	4	M15002999.MH
	5	"
B	0	M28003999.MH
	1	"
	2	M38005199.MH
	3	"
	4	M49005999.MH
	5	"
C	0	M57006999.MH
	1	"
	2	M66007999.MH
	3	"

Table 3.2Magnetic Tape File List 2

<u>Tape Name</u>	<u>Tape File Number</u>	<u>Content (Disk Files)</u>
D	0	NQ1501499--.FB *
	1	"
	2	N10002499--.FB
	3	"
	4	N15002999--.FB
	5	"
	6	N28003999--.FB
	7	"
	8	N38005199--.FB
	9	"
	10	N49005999--.FB
	11	"
	12	N57006999--.FB
	13	"
	14	N66007999--.FB
	15	"

* - = A-F (Each set of six files are not necessarily in the same order as the letters A through F).

Table 3.3Magnetic Tape File List 3

<u>Tape Name</u>	<u>Tape File Number</u>	<u>Contents (Disk Files)</u>
E	0	M1-.F3, M1-.F6*
	1	"
	2	M2-.F3, M2-.F6*
	3	"
	4	M3-.F3, M3-.F6*
	5	"
F	0	MT-.F3, MT-.F6*
	1	"
	2	M-L.F3, M-L.F6**
	3	"

* - = (A-F)

** - = 1, 2, 3, or T

APPENDIX AINSTRUMENTAL PARAMETERS

Each LED contained a thin phoswich scintillator of $\sim 100 \text{ cm}^2$ geometric area behind a fine slat collimator within a cylindrical well which provided coarse collimation. The two LEDs are called detector D3 (also LED1 or the left slat detector) and detector D6 (also LED2 or the right slat detector). The collimation of each detector was nominally $1.5^\circ \times 20^\circ$ (FWHM) but the coarse collimation of D6 was affected during two episodes when it was partially occulted by the experiment blocking crystal. Details of the collimation are given below.

All events included in the present submittal were analyzed aboard the spacecraft into 64 pulse height channels (channels 0-63) by the Main Pulse Height Analyzer (MPHA). These data were combined into four broad energy channels for each detector. The channel definitions are given in Table A1.

A.1 Collimator Transmission Functions

The collimator orientations may be specified relative to a Cartesian coordinate system fixed in the spacecraft. In this system, the +z-axis was the spin axis and was nominally kept pointed at the sun. The +y-axis was the center of the fields of view of the A4 detectors. For each LED we define a new coordinate system such that \hat{V} , a unit vector, is toward the center of the field of view, \hat{P} is perpendicular to the plane of the slats in the fine collimator, and $\hat{Q} = \hat{V} \times \hat{P}$ is in the plane of the slats (see Figure A1). Then,

expressed in xyz components, we have for D3:

$$\begin{aligned}\hat{V} &= (0, 1, 0) \\ \hat{P} &= (-\sqrt{3}/2, 0, 1/2) \\ \hat{Q} &= (1/2, 0, \sqrt{3}/2)\end{aligned}$$

and for D6:

$$\begin{aligned}\hat{V} &= (0, 1, 0) \\ \hat{P} &= (-\sqrt{3}/2, 0, -1/2) \\ \hat{Q} &= (-1/2, 0, \sqrt{3}/2)\end{aligned}$$

For each detector, \hat{V} , \hat{P} , and \hat{Q} form an orthonormal set of vectors and may be used as the axes of a new coordinate system.

When the source direction \hat{S} and \hat{V} , \hat{P} and \hat{Q} are all expressed in one common coordinate system, the angles α and β , of the source direction relative to the center of the field of view projected onto the planes perpendicular and parallel to the plane of the slats respectively, are defined by:

$$\tan \alpha = \frac{\hat{S} \cdot \hat{P}}{\hat{S} \cdot \hat{V}}, \quad \tan \beta = \frac{\hat{S} \cdot \hat{Q}}{\hat{S} \cdot \hat{V}}$$

The fine collimator transmission factor is given by:

$$\begin{aligned}T_{\text{fine}} &= 1 - \frac{|\alpha|}{\alpha_{\text{FWHM}}} \quad , \quad |\alpha| \lesssim \alpha_{\text{FWHM}} \\ T_{\text{fine}} &= 0 \quad , \quad |\alpha| > \alpha_{\text{FWHM}}\end{aligned}$$

with $\alpha_{\text{FWHM}} = 1.46^\circ$.

The coarse collimator transmission factor for D3 (for all time) and for

D6 when it was not partially occulted by the blocking crystal is given by:

$$T_{\text{coarse}} = \frac{e - (\beta - \beta_{\text{off}})^2 / \beta_w^2}{1 - K} \quad |\beta| \leq 21.0^\circ$$

$$T_{\text{coarse}} = 0 \quad |\beta| > 21.0^\circ$$

where $K = e^{-\beta_{\text{max}}^2 / \beta_w^2}$ and

$$\beta_{\text{max}} = 21.0^\circ$$

$$\beta_w = 13.36^\circ$$

$$\beta_{\text{off}} = 0.25^\circ$$

For D6 during the time period 8/19/77 to 4/3/78 use the above formulae

with

$$\beta_w = 12.91^\circ$$

$$\beta_{\text{off}} = 0.85^\circ$$

For this time period, this formula does not take into account the effect of the blocking crystal photomultiplier housing which was also in the field of view of detector D6. The photomultiplier housing was responsible for the slight (~10 percent) reduction of area on-axis during this time period.

For D6 during the time period 9/11/78 to 10/23/78 use the following formulae:

$$T_{\text{coarse}} = \sum_{i=0}^4 A_i \beta^i \quad 2^\circ < \beta \leq 21^\circ$$

$$= \sum_{i=0}^4 B_i \beta^i \quad -21^\circ < \beta \leq 2^\circ$$

where the coefficients A_i , B_i are given in Table A2.

Theoretical plots of the coarse transmission factors are given in Figure A2. The above formulae are empirical fits derived from a combination of flight data, machine drawings, and theoretical curves.

A.2 Energy Loss/Pulse Height Conversion Gain Calibration Results

The energy loss to pulse height conversion gain was a function of the detector orientation relative to the local magnetic field and a function of time. The following algorithm may be used to approximately determine the gain for a given time T (the reduced Julian Day = JD-2,442,500) and magnetic field \hat{B} (specified in gauss in the spacecraft x, y, z coordinate system):

1) Determine the magnetic field components in spacecraft coordinates. A zero order model may be constructed in which the spacecraft is in a circular, equatorial orbit in a perfectly dipolar terrestrial field. This gives a field of constant direction and magnitude. ($\hat{B} = B_0 \hat{V}$ where $B_0 \sim 0.3$ gauss and \hat{V} is a unit vector pointing towards the north celestial pole).

2) Determine the centroid c_j (for detector j) of the background feature of energy 27.5 keV using the formula:

$$c_j = A_{0j} + A_{1j} B_x + A_{2j} B_y + A_{3j} B_z + G_j(T)$$

where

$$G_{D3}(T) = -5.64 \times 10^{-6} (T-1258)^2 - 0.36 e^{-(T-870)/50}$$

$$\begin{aligned} G_{D6}(T) &= -1.22 + 0.0305 (T-870) & T \leq 910 \\ &= 0.00194 (T - 940) & T > 910 \end{aligned}$$

and the coefficients A_{ij} are given in Table A3.

3) Compute the conversion gain f_j :

$$f_j = \frac{27.5}{c_j - 2.0} \text{ keV/channel}$$

4) Use the following expression to compute the energy which corresponds to the bottom of channel x_j in detector j:

$$E_j = f_j (x_j - 2.0)$$

TABLE A1BROAD ENERGY CHANNEL DEFINITIONS

DETECTOR	BROAD CHANNEL DESIGNATION	MPHA CHANNELS (INCLUSIVE)	NOMINAL ENERGY RANGE (keV)
D3	A	7-9	13-25
	B	10-14	25-40
	C	15-29	40-80
	D	30-63	80-180
D6	A	7-10	13-25
	B	11-15	25-40
	C	16-32	40-80
	D	33-63	80-180

TABLE A2COEFFICIENTS FOR COLLIMATOR TRANSMISSION CALCULATIONS

i	A _i	B _i
0	0.6773082	0.5039136
1	-0.7615900 × 10 ⁻¹	0.3589736 × 10 ⁻¹
2	0.1272695 × 10 ⁻¹	-0.1430436 × 10 ⁻²
3	-0.9976450 × 10 ⁻³	-0.1830180 × 10 ⁻³
4	0.2337400 × 10 ⁻⁴	-0.418600 × 10 ⁻⁵

TABLE A3COEFFICIENTS OF MAGNETIC FIELD GAIN DEPENDENCE

<u>DETECTOR</u>	A_0	A_1	A_2	A_3
D3	12.52	-1.72	-0.55	0.32
D6	13.35	-0.98	0.06	-0.14

APPENDIX A3Time - ILONG Conversion Factors

Table A4 contains the ILONG ranges in which detector D6 was partially blocked and also indicates the sense of elevation in the collimator (since the partial occultation of the detector destroys the symmetry of the collimator with respect to elevation).

Table A5 contains general information on the correspondence between ILONG, time, GSFC sequence number, and the actual true orbit number.

TABLE A4

<u>.MH File</u>	<u>ILONG Range</u>	<u>Collimator Trans Code*</u>
MQ1501499	0-183 183-224	-1 +1
M10002499	0-224	-1
M15002999	0-224	-1
M28003999	0-15 16-159 160-224	+1 0 -1
M38005199	0-224	0
M49005999	0-224	0
M57006999	0-48 49-208 209-224	-2 0 2
M66007999	0-48 49-224	-2 0

* Collimator Transmission Code:

0: Unblocked collimator

+1, -1: D6 partially blocked - 8/19/77 to 4/3/78

+2, -2: D6 partially blocked - 9/11/78 to 10/23/78

For a code less than zero the sense of elevation (angle β) is reversed (i.e., the actual ecliptic longitude of the spin axis was $> 180^\circ$).

Table A5

SPIN AXIS ECLIPTIC		UT			ACTUAL	ASSIGNED
LONGITUDE	ILONG	M	D	Y	ORBIT *	SEQUENCE *
140	175	8	15	77	871	45
160	200	9	2	77	889	330
180	0	9	23	77	910	646
200	25	10	13	77	930	963
220	50	11	2	77	950	1273
240	75	11	22	77	970	1581
260	100	12	12	77	990	1884
280	125	1	1	78	1010	2192
300	150	1	20	78	1029	2495
320	175	2	9	78	1049	2797
340	200	3	1	78	1069	3107
0	0	3	21	78	1089	3417
20	25	4	10	78	1109	3736
40	50	5	1	78	1130	4055
60	75	5	21	78	1150	4373
80	100	6	11	78	1171	4698
100	125	7	2	78	1192	5026
120	150	7	23	78	1213	5352
140	175	8	13	78	1234	5671
160	200	9	2	78	1254	5993
180	0	9	22	78	1274	6307
200	25	10	14	78	1295	6639
220	50	11	2	78	1315	6950
240	75	11	22	78	1335	7258
260	100	12	12	78	1355	7576
280	125	12	31	78	1374	7876

Notes to Table A5:

- 1) The ecliptic longitude of the spacecraft spin axis in degrees.
- 2) The value of ILONG corresponding to the spin axis ecliptic longitude.
- 3) The date (UT) corresponding to the spin axis position of column 1.
- 4) The corresponding reduced Julian Date (= Julian Date - 2,442,500).
- 5) The actual number of the spacecraft orbit during which the spin axis was oriented with the given ecliptic longitude.
- 6) The sequence number assigned by NASA to the corresponding orbit.
 Note that the sequence numbers did not advance in a precise, logical order.

APPENDIX BBackground Reconstruction Algorithm

To obtain the estimated background count rates b_{IAZ} ($IAZ = 0, \dots, 899$) from the 10 coefficients c_i ($i = 1, \dots, 10$) use the formula:

$$b_{IAZ} = \frac{1}{30} \left\{ c_1 + 2 \sum_{j=2}^5 [c_{2j-1} \cos\left(\frac{2\pi(j-1)IAZ}{900}\right) - c_{2j} \sin\left(\frac{2\pi(j-1)IAZ}{900}\right)] \right\}$$

The coefficient c_2 does not appear since it is always zero.

APPENDIX C

C THE FOLLOWING FORTRAN ALGORITHM DEFINES THE SMOOTHING
C FUNCTION USED ON THE SKYMAP DISPLAY FILES:

C RANGE OF ILONG: ILMIN - ILMAX

```
I=ILONG
IL=ILONG-1
IF (IL.LT.ILMIN) IL=ILMIN
IU=ILONG+1
IF (IU.GT.ILMAX) IU=ILMAX
```

C RANGE OF IAZ: 0 - 899

```
J=IAZ
JL=J-1
IF (JL.LT.0) JL=899
JU=J+1
IF (JU.GT.899) JU=0
```

C THE COUNT RATE IN THE BIN DEFINED BY ILONG, IAZ IS DENOTED
C BY R(ILONG,IAZ). THE LIVETIME FOR THIS BIN IS DENOTED BY
C E(ILONG,IAZ). WE ALSO USE THE DEFINITION:

C N(ILONG,IAZ)=R(ILONG,IAZ)*E(ILONG,IAZ)

C WITH THE ABOVE DEFINITIONS THE SMOOTHING FORMULAE ARE:

```
1 NSM00(I,J)=N(I,J)+0.5*(N(IL,J)+N(IU,J)+N(I,JL)+N(I,JU))+  
1            0.25*(N(IL,JL)+N(IU,JL)+N(IL,JU)+N(IU,JU))  
1 ESM00(I,J)=E(I,J)+0.5*(E(IL,J)+E(IU,J)+E(I,JL)+E(I,JU))+  
1            0.25*(E(IL,JL)+E(IU,JL)+E(IL,JU)+E(IU,JU))  
1 RSM00(I,J)=NSM00(I,J)/ESM00(I,J)
```

C THIS IS DONE FOR ALL POSSIBLE VALUES OF ILONG, IAZ
C NOTE THAT WHILE SMOOTHED EXPOSURE DATA IS USED IN COMPUTING
C THE SMOOTHED COUNT RATE DATA, UNSMOOTHED EXPOSURE DATA HAS
C BEEN RECORDED IN THE M*L.F3 AND M*L.F6 FILES.

Appendix D

DATA STORAGE AND HANDLING

STORAGE OF DATA

Integers

Integers are stored in two's complement form, using one full 16-bit word. The allowable range is $-2^{15}-1$ to $+2^{15}-1$ (-32,767₁₀ to 32,767₁₀). The storage format is:

s	Two's Complement Magnitude	
bit 0		15

where: s is the sign ($0 = \text{plus}$, $1 = \text{minus}$)

Real Numbers

Real numbers are stored in two words with the high order word preceding the low order word in memory. Position 0 contains the sign, bits 1 through 7 represent the exponent, and bits 8 through 31 are the mantissa.

The exponent is represented in excess 64 form, that is, as a seven digit, two's complement integer to which is added an offset of 100₁₀. Thus,

100_g is an exponent of 9

177_8 is an exponent of 63.

077 is an exponent of -1.

The mantissa is a normalized hexadecimal fraction between .0625000 and .999999. (All floating point numbers in DGC FORTRAN IV computations are maintained in normalized form.) Real numbers have 6 to 7 decimal digits of significance.

The storage format of real numbers is

bit	0	78	15
s	exponent	mantissa	
		mantissa	
16			21

Double Precision Numbers

Double precision numbers are stored in four words. The sign and exponent are stored in the same manner as real numbers. The normalized hexadecimal mantissa is stored in the remaining 56 bits. Double precision numbers have 16 to 17 decimal digits of significance.

The storage format of double precision numbers is

STORAGE OF DATA (Continued)Double Precision Numbers (Continued)

bit	0	78	15
s	exponent	mantissa	
		mantissa	
		mantissa	
		mantissa	

Complex Numbers

Complex numbers are stored as two real data. The real part is stored in the first two words and the imaginary part in the second two words. The storage format of complex numbers is:

bit	0	78	15	
s	exponent	mantissa		real part
		mantissa		
s	exponent	mantissa		imaginary part
		mantissa		

Double Precision Complex Numbers

Double precision complex numbers are stored as two double precision data. The real part is stored in the first four words and the imaginary part is stored in the second four words. The storage format of double precision complex numbers is:

bit	0	78	15	
s	exponent	mantissa		real part
		mantissa		
		mantissa		
		mantissa		
s	exponent	mantissa		imaginary part
		mantissa		
		mantissa		
		mantissa		

String Data

String data are stored ascending in core, with one character stored per 8-bit byte (two characters per memory word). The leftmost bit of each byte is always 0.

If the character count of a string is odd, the terminating byte is all zeroes; if the character count is even, the string is terminated by a word of all zeroes. However, when a variable is initialized to a string datum (DATA statement) and the character count is even, no all-zero word is generated.

The storage format of string data is:

bit	0	78	15	
0	char ₁	0	char ₁	
0	char ₂	0	char ₂	
	.			
	.			
	.			
0	char _{i-1}	0	char _i	
	0			

Appendix E

GDUMP Type Codes

The following record types have been defined for GDUMP format tapes.
Each block (physical record) starts with one of them.

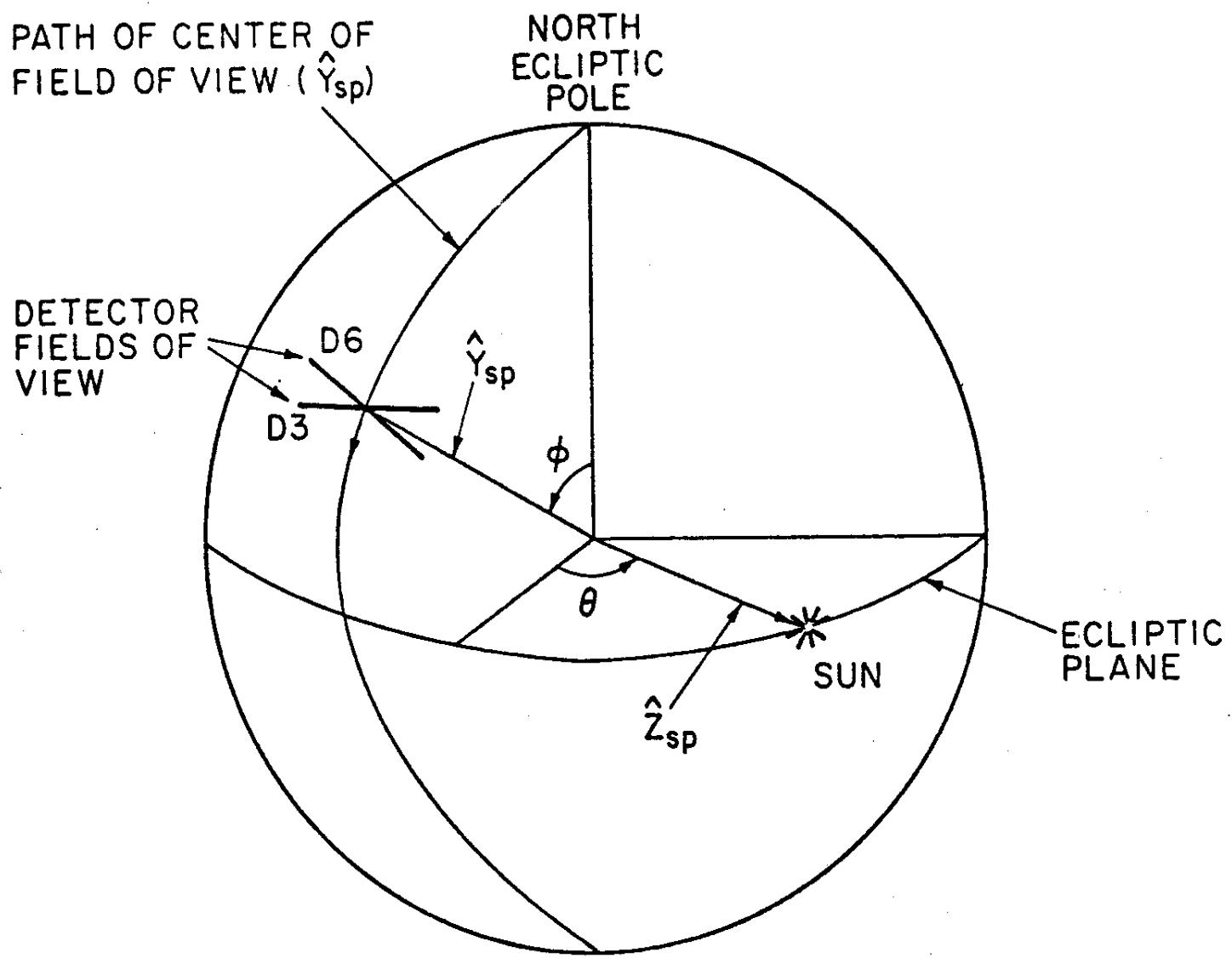
<u>Type Code</u>	<u>Length</u>	<u>Definition</u>
-2	0	This block is a continuation of the same disk file in the previous block.
-3	18	The UFD is found in the 18 words. The rest of the block contains the first of the disk file.
-4	0	The rest of this block and tape file have been trashed so skip to next tape mark.
-12	0	This block is a copy of the previous -2 block.
-13	18	This block is a copy of the previous -3 block.

Appendix F

Data General User file Description

<u>Word</u>	<u>Type</u>	<u>Contents</u>
0-4	10Ch	Filename
5	2Ch	Extension
6	I	Attributes
7	I	Link access attributes
8	I	Block Count - 1
9	I	Byte count in last block
10	I	First address (i.e. logical address of first block in file)
11	I	year/day last accessed (days since 1/1/68)
12	I	year/day created or most recently modified
13	I	Hour/minute created or most recently modified
14	I	UFD variable information
15	I	UFD variable information
16	I	User Count
17	I	DCT link

HEAO A4 SKYMAP COORDINATES

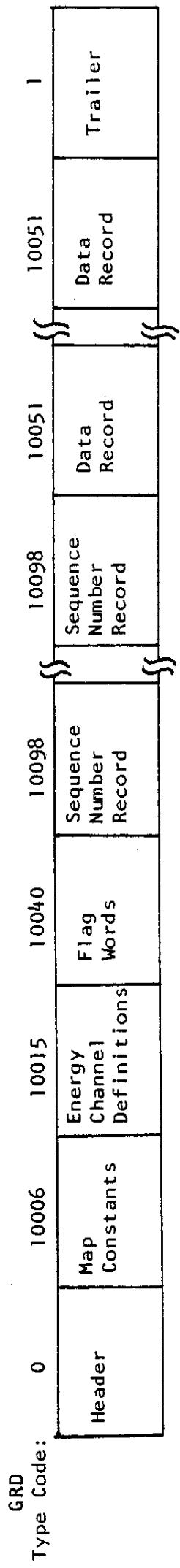


θ : ECLIPTIC LONGITUDE OF \hat{Z}_{sp}

ϕ : AZIMUTH OF \hat{Y}_{sp} (AROUND \hat{Z}_{sp})

Figure 1

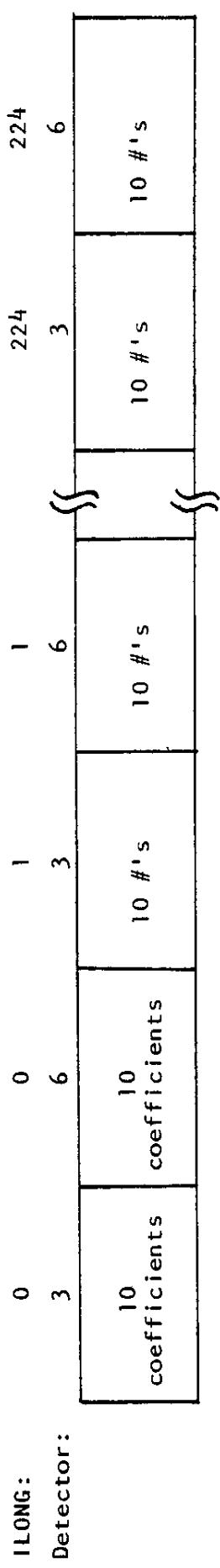
Logical Organization of -.MH Files



Order of Data Records: Value of $900 \times \text{ILONG} + \text{IAZ}$ increases.

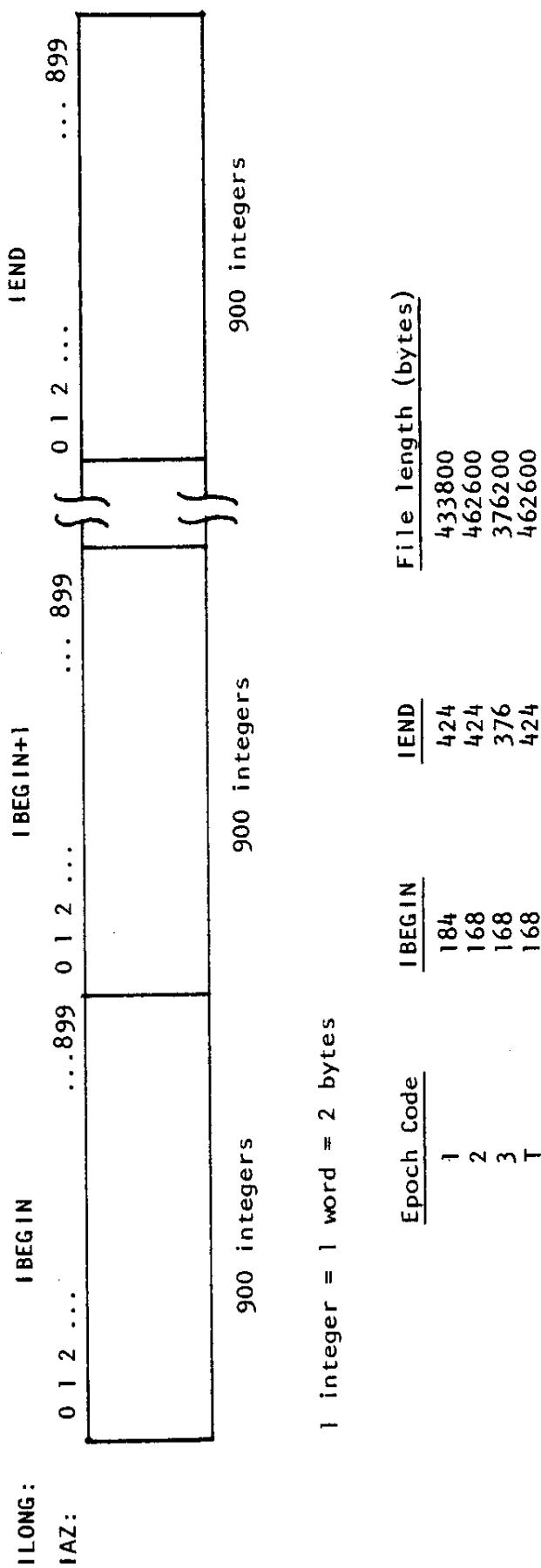
Figure 2.1

Logical Organization of -.FB Files



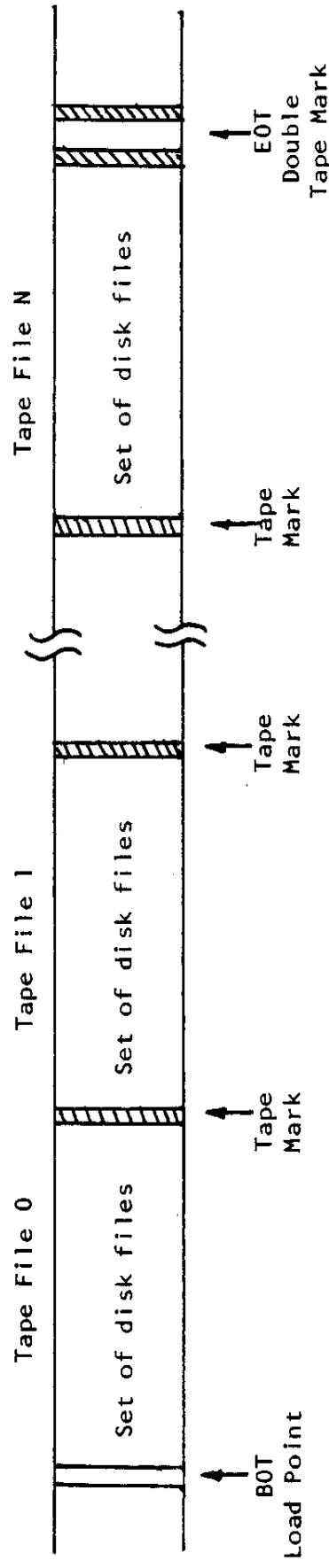
Each coefficient is a floating point number (= 2 words or 4 bytes).

Figure 2.2

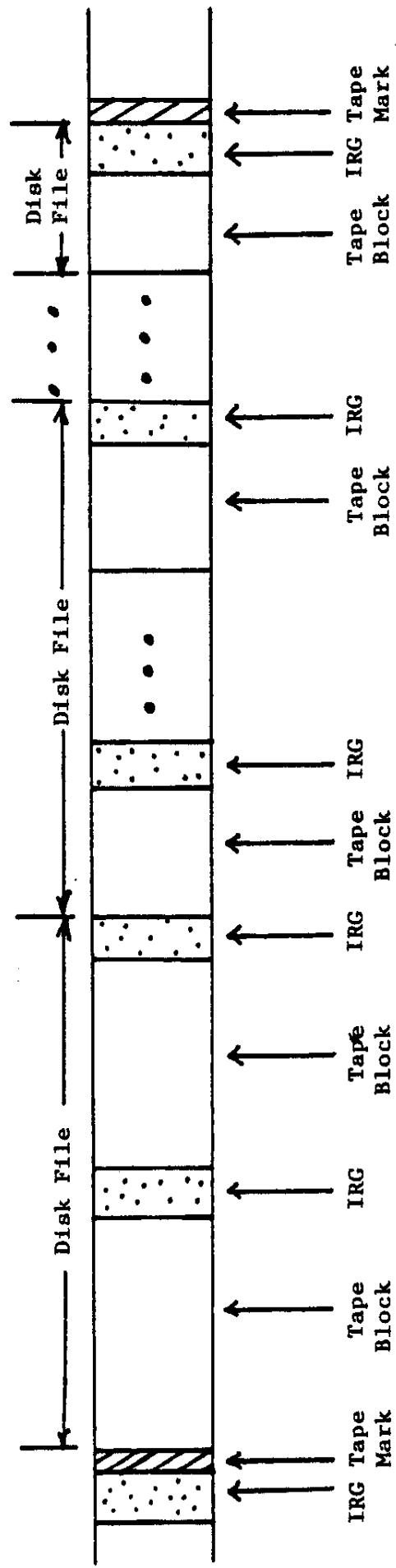


Logical Organization of Skymap Display Files

Figure 2.3

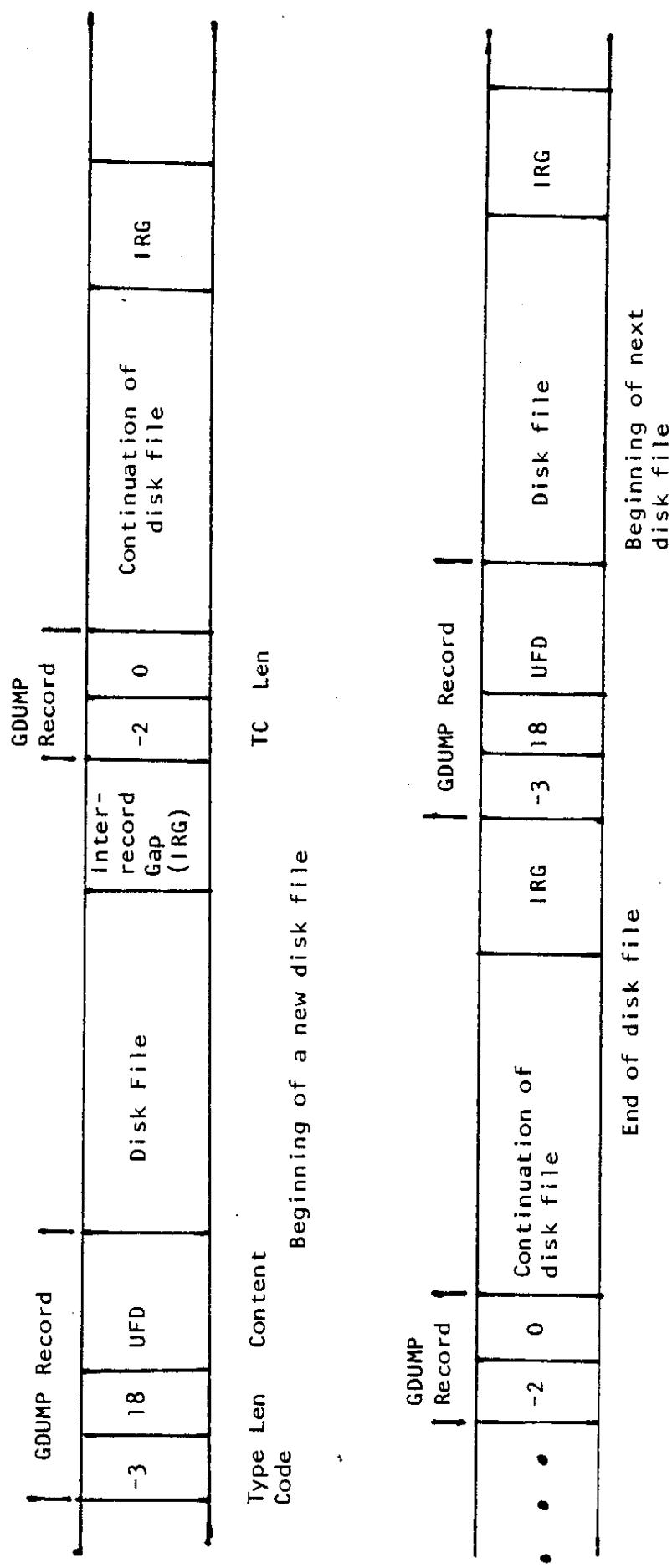


File Structure of a HEAO-1 A4 Data Tape



Disk File Structure within a Tape File

Figure 3.1



Format of a Magnetic Tape written using GDUMP

Figure 3.2

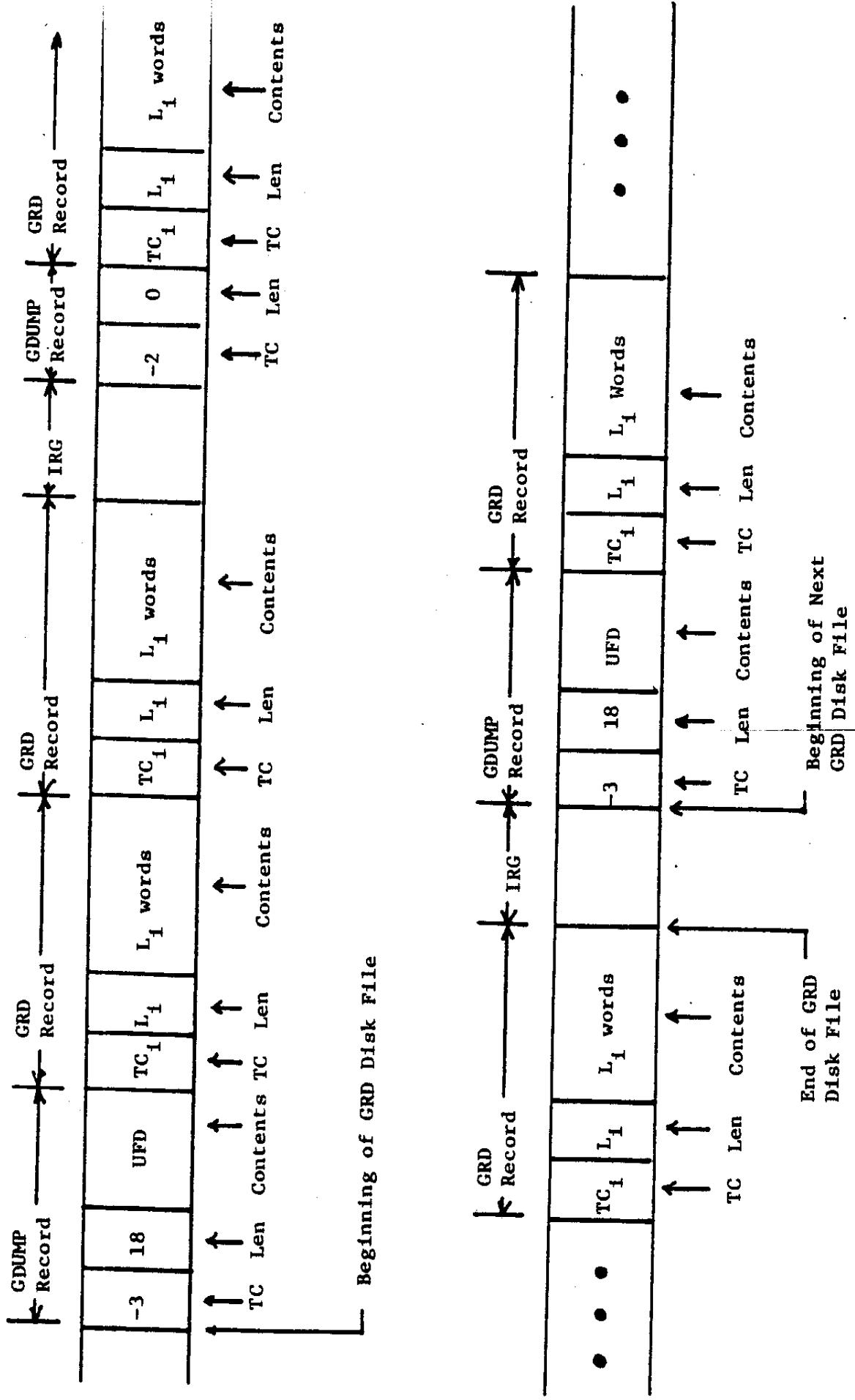


Figure 3: Structure of a GRD Disk File Written onto Magnetic Tape

Figure 3.3

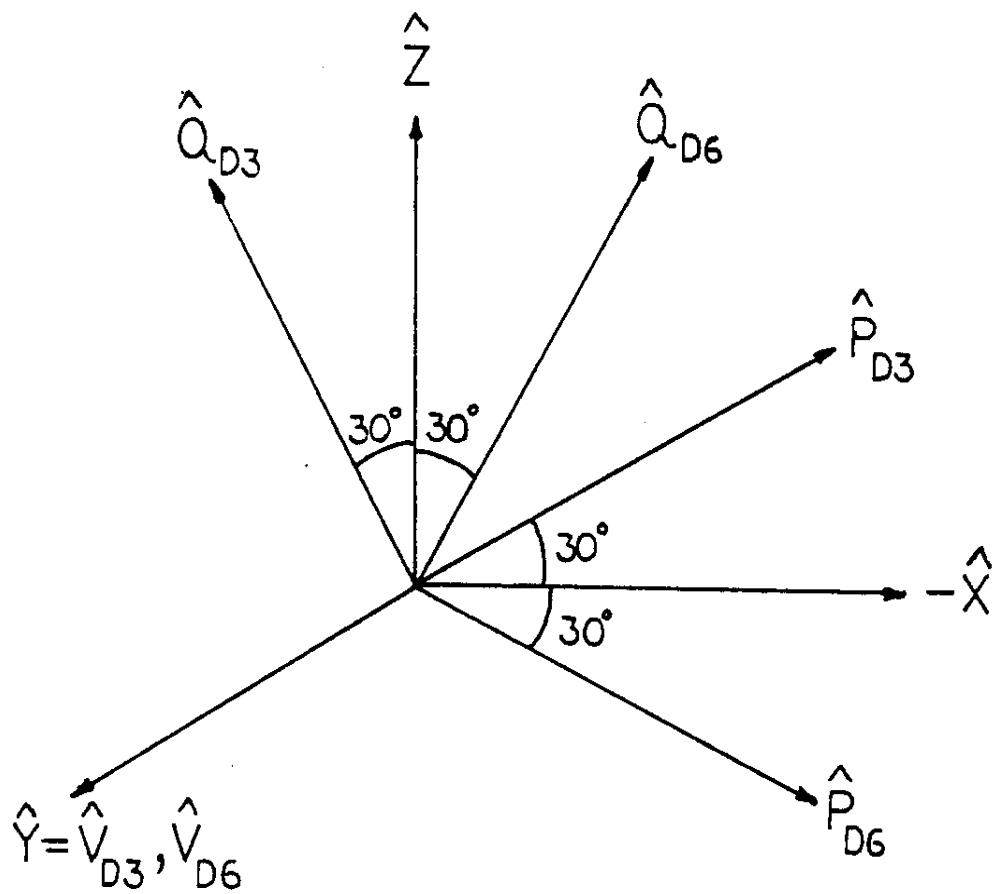


Figure A1: Reference vectors for the slat collimators of detectors D3 and D6 relative to the spacecraft coordinate system. \hat{V} is the view direction, \hat{P} is perpendicular to the plane of the slats, and \hat{Q} is in the plane of the slats and is perpendicular to both \hat{V} and \hat{P} .

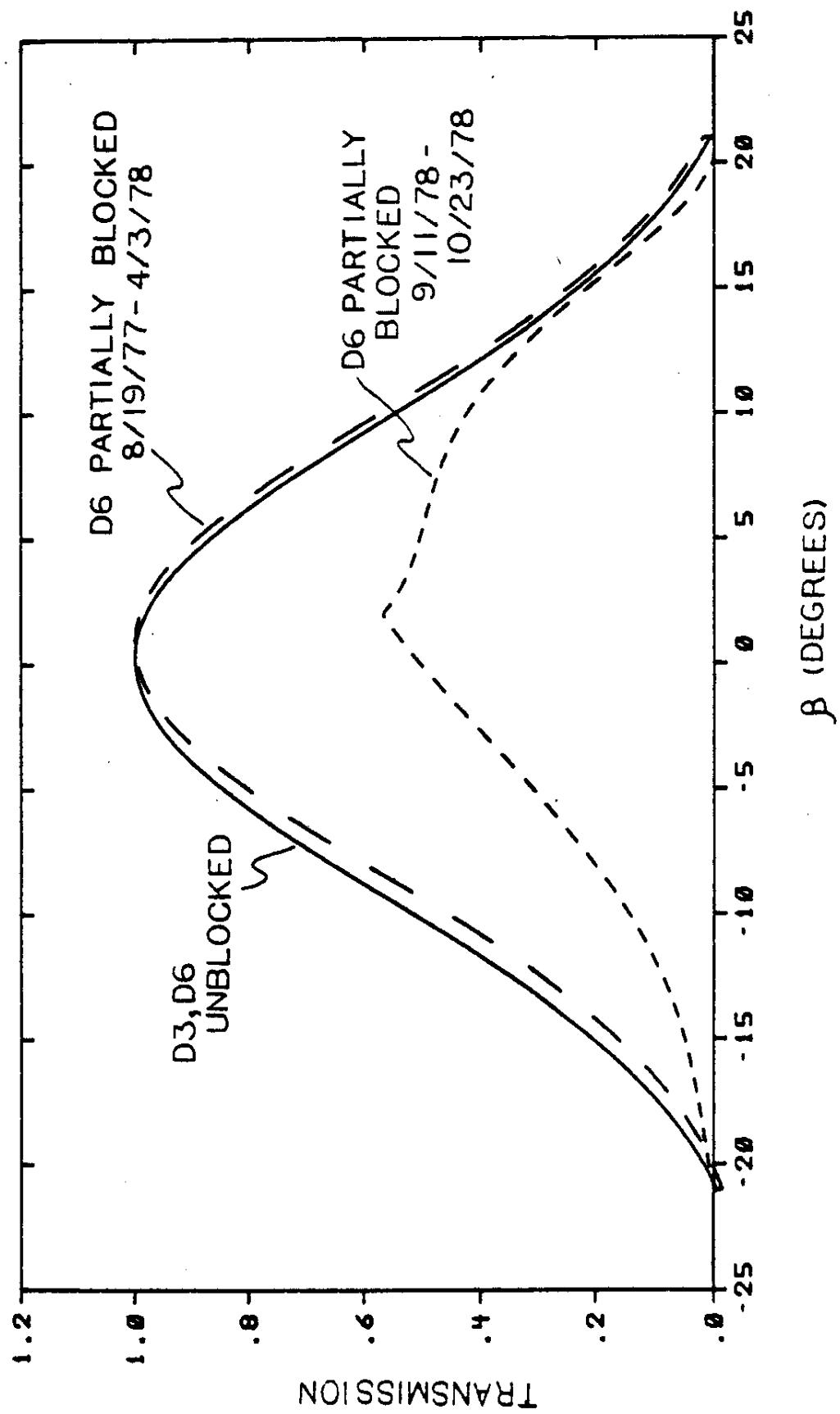


Figure A2: The collimator transmission for a source in the plane of the slats of the collimator as a function of the elevation angle β in the plane of the slats.

JUMP OF TAPE DOUTE

INPUT TAPE DATA INPUT DOUTE ON TUI 5 NF ESR 211 SR 311 SR 6 LAST 1

卷之二十一

(7600)	00530064	00530062	00530063	00530063	00630063	00630064	00650064	00640065	00640062	00640062	00640062	00640062	00640062	00640062
(7640)	00640063	-00620063	00640063	00640063	00630064	00650065	00640063	00630063	00630062	00630062	00630062	00630062	00630062	00630062
(7680)	00530063	00530061	00530063	00530063	00630063	00630062	00630063	00630063	00620062	00620062	00620062	00620062	00620062	00620062
(7720)	005610051	005610051	005610051	005610051	00610051	00610051	00620063	00620063	00640064	00640064	00640064	00640064	00640064	00640064
(7760)	00520063	00520063	00520063	00520063	00640063	00640063	00630063	00630063	00640064	00640064	00640064	00640064	00640064	00640064
(7800)	00520063	00520063	00520063	00520063	00630063	00630063	00630063	00630063	00640064	00640064	00640064	00640064	00640064	00640064
(7840)	00620062	00620062	00620062	00620062	00630064	00630064	00640064	00640064	00630064	00630064	00630064	00630064	00630064	00630064
(7880)	00640063	00640063	00620063	00610061	00640063	00630062	00640065	00640063	00620061	00610061	00610061	00610062	00610062	00610062
(7920)	00620062	00620062	00620062	00620062	00630063	00630063	00640063	00640063	00620062	00620062	00620062	00620062	00620062	00620062
(7960)	00620062	00620062	00620062	00620062	00630062	00630062	00640062	00640062	00620062	00620062	00620062	00620062	00620062	00620062
(8000)	00620063	00630062	00630064	00640063	00620062	00640063	00630063	00630063	00610060	00640067	00660063	00640066	00650064	00650064
(8040)	00630063	00630063	00630063	00630063	00630063	00630063	00630063	00630063	00620062	00620062	00630062	00630062	00620062	00620062
(8080)	00620062	00620062	00620062	00620062	00620062	00620062	00630064	00630064	00640063	00640063	00640063	00640063	00640063	00640063
(8120)	00640064	00640064	00660069	00660069	00680068	00680067	00650067	00650067	00640063	00630063	00630062	00620062	00620062	00630063
(8160)	00630062	00610062	00610062	00610062	00630062	00630062	00630062	00630062	00610061	00610061	00620065	00620065	00620065	00630063

FILE	INPUT RECS.	DATA RECORDS INPUT	MAX. SIZE	READER SUMMARY	INPUT RETRIES
1	636	636	8190	PERV ZERO B SHCRT UNDEF.	0 0 0 0

FILE	REC	RECORD	LENTH	REC 1 LENGTH	BYTES	19BYTES	REC 1 LENGTH	BYTES	19BYTES
(0)	FFF00012	4D334100	00000000	00040000	02DEC000	00040000	E00614D2	143F1007	0000010C
(40)	00610062	00620061	00610063	00630062	00630065	00640065	00640062	00630063	00620063
(80)	00640065	00670065	00650063	00620061	00610061	00610060	00600063	00620061	00630063
(120)	00630062	00640066	00640065	00650063	00620063	00620064	00650065	00620061	00630063
(160)	00640063	00640065	00660065	00650064	00630063	00650063	00610062	00640064	00620064
(200)	00630064	00660065	00630062	00600060	00620064	00640064	00640064	00620060	00610065
(240)	00640064	00640064	00620061	00630064	00620060	005E0060	00630063	00620063	00630062
(280)	00620063	00630063	00630062	00610062	00630062	00600060	00600062	00630062	00620060
(320)	C05F005F	00610065	00680065	00650065	00630063	00630063	00620063	00650066	00650063
(360)	00650065	0063005F	005F0051	00610055	005E0062	00640062	00640062	00670066	00640061
(400)	00610064	0068006A	00670063	00620061	00610062	00620060	00610063	00630062	00640066
(440)	006E0064	00640064	00630068	00660063	00630063	00630062	00620062	00610063	00640066
(480)	00650067	00640062	00620063	00630063	00630062	00620062	00620063	00630062	00650064
(520)	00650068	00670064	00630064	00640062	00610060	00620066	00650065	00650063	00620063
(560)	00620062	00620063	00640064	00630065	00650063	00650063	00610061	00620063	00640063
(600)	00650065	00650064	00640065	00640065	00640063	00640062	00620061	00630063	00620061
(640)	00620061	00610062	00620062	00610061	00610061	00620064	00660067	00630062	00630062
(680)	00610061	00620062	00630064	00640065	00650065	00650064	00650065	00620063	00620061
(720)	00620066	00670064	00630064	00650065	00670066	00620060	00600060	005F005E	00620061
(760)	00640063	00610062	00640065	00650063	00620062	00630064	00660067	00630063	00630064
(800)	00640068	00660064	00640063	00630065	00670066	00670067	00640062	00620060	00610064
(840)	00620063	00650065	00650062	005FF0060	00610061	00600061	0064006E	00650063	00630065
(880)	00640063	00620062	00620063	00640063	00620065	00660065	00650064	0062005F	005F0061
(920)	00670066	00630062	00630064	00630061	00610062	00610062	00640063	00620063	00640063
(960)	00610060	00620063	00620062	00640062	00620064	00640063	00620062	00630062	00620063
(1000)	00630067	00680067	005E0066	00660064	00640064	00620062	00640064	00630062	00630065
(1040)	00660067	00680067	005E0066	00660063	00620063	00620063	00620063	00620062	00620061
(1080)	005F005F	00610062	00640063	00610060	00610060	00620063	00610064	00640063	00610063
(1120)	00650068	006C0072	007A0082	00886088	00810074	00680064	00650063	00610062	00630063
(1160)	00640064	0061005F	00500061	00630064	00640065	00620064	00640066	00670065	00620064
(1200)	00610060	00610064	00670065	00610062	00630063	00620061	00620062	00620063	00630063
(1240)	00650067	00640064	00690068	00660064	00630063	00630063	00620062	00630061	00620063
(1280)	00620064	00640063	00630066	00670067	00650066	00620064	00660064	00630063	00640064
(1320)	00630064	00640063	00630063	00620060	00600060	00600061	00630064	00610061	00630064
(1360)	00630062	00640065	00660066	00660066	00640062	00630064	00650065	00640062	00610061
(1400)	00630064	00640065	006E0065	00630062	00620062	00630064	00630061	00630061	00640063
(1440)	00610061	00640067	00670065	00640064	00640064	00630064	00640064	00630065	00620061
(1480)	00620061	005F005F	00610061	00610062	00610062	00610060	00620060	00610063	00640063
(1520)	00630064	00650063	005E0063	00650066	00650063	00610062	0061005E	005F0063	00640063
(1560)	C0E20064	00660066	005E0065	00660064	00610062	00630063	00610061	00630063	00620062
(1600)	00600062	00640063	00630062	00640066	00650063	00650067	00660065	00630062	00630064
(1640)	00640063	00630063	00630063	00650065	00650064	00620060	00610062	00630063	00640064
(1680)	006C0064	00650063	00650063	00650065	00650064	00620060	00610062	00630063	00620064
(1720)	00630062	00620061	00630064	00650067	00670063	00610060	00610066	00640065	00620062
(1760)	C0E20063	00630064	00630062	00610062	00650065	00620063	00630063	00620064	00640061

GUMS OF TAPE DOUT

D-59747
8101179 - 111129

INPUT TAPE DOUT ON TUI
DATA INPLT HS AF 4 SR 1 1 1 SR 4 1 1 SR 4 LAST 1

FILE	1 RECORD	MTA	LENGTH	8190BYTES
(0)	FFFDD012	4D544100	00000000	00004633 00040000 03870108 1A121477 14480A2C 00000100 4001001A
(400)	00620062	00620063	00540065	00640062 00620064 00640063 00620063 00630063 00630062 00620062
(800)	00640064	00640064	00620062	00630063 00640064 00640064 00640063 00630063 00640064 00640064
(1200)	00620063	00640064	00640064	00640063 00620063 00630062 00620061 00610063 00630063 00630062 00630064
(1600)	00640063	00640065	00630063	00620063 00630062 00630062 00620062 00610063 00630063 00630063 00650065
(2000)	00620063	00640063	00620062	00610063 00630062 00620061 00610062 00630064 00620064 00620064 00650065
(2400)	00660068	00620064	00670064	00650064 00630064 00630063 00620063 00630063 00630063 00630063 00640064
(2800)	00630063	00640064	00650062	00630063 00630062 00630062 00630061 00630061 00630061 00630064 00630062
(3200)	00620062	00640062	00630062	00630063 00630062 00630062 00630061 00630061 00630061 00620064 00630062
(3600)	00640064	00630062	00620062	00630063 00640063 00630062 00630062 00620063 00630063 00630064 00650064
(4000)	00630064	00650065	00630052	00630064 00620062 00630062 00620063 00620063 00620063 00610062
(4400)	00640064	00640063	00530064	00640063 00630063 00630063 00630062 00610062 00640066 00660064
(4800)	00620062	00610061	00520064	00640063 00630063 00630063 00630062 00630062 00630063 00620062
(5200)	00640066	00650064	00650064	00640064 00630064 00630062 00620062 00620062 00630063 00640065
(5600)	00640063	00630063	00630063	00640063 00620063 00620063 00620063 00630063 00630062 00630064 00630064
(6000)	00650063	00620063	00630063	00640063 00630063 00630062 00620062 00620062 00630063 00630062
(6400)	00620062	00610063	00630062	00620062 00610062 00610061 00610062 00620062 00620062 00620062
(6800)	00630062	00630063	00630063	00640065 00630063 00630062 00620062 00620061 00630063 00620062
(7200)	00640065	00550064	00550064	00530063 00630064 00620065 00620061 00620061 00620062 00620062
(7600)	00640063	00630062	00620063	00640063 00620062 00620062 00620063 00630063 00630062 00630063
(8000)	00640065	00640064	00630062	00620064 00620063 00630065 00640062 00640062 00630063 00630064
(8400)	00630063	00640064	00530063	00630063 00630063 00630062 00620062 00620062 00630063 00630063
(8800)	00630062	00630063	00520062	00640063 00630063 00630062 00620062 00620062 00620063 00630062
(9200)	00620064	00630062	00530064	00640063 00630063 00630062 00620062 00620062 00630063 00640065
(9600)	00640063	00630062	00620063	00640063 00620062 00620062 00620061 00620061 00620062 00620062
(10000)	00630063	00640062	00560062	00640064 00630063 00630062 00630063 00640064 00640064 00630063
(10400)	00640064	00540063	00630063	00620062 00620062 00620063 00620062 00630063 00630063
(10800)	00620063	00640063	00520062	00610062 00610062 00620063 00620063 00630063 00630063
(11200)	00640066	006B0070	00740078	00770073 006F006A 00670065 00670065 00670065 00670065 00670065
(11600)	00670067	00650064	00650064	00630063 00630063 00630062 00620062 00620062 00630063 00640065
(12000)	00640064	00640064	00530052	00630065 00620065 00620061 00620061 00620061 00620062 00620062
(12400)	00640065	00630064	00600061	00630063 00610061 00630063 00640065 00640065 00640064 00650064
(12800)	00630065	00650064	00630064	00640064 00620062 00620063 00620063 00630063 00630063
(13200)	00650065	00650064	00620062	00630062 00630062 00620063 00640065 00640065 00640064 00640063
(13600)	00620063	00640064	00630064	00630063 00630063 00630062 00620062 00620062 00630063 00630063
(14000)	00620062	00630063	00640064	00630064 00640065 00640065 00640065 00630063 00630062 00630062
(14400)	00630064	00630064	00550065	00640065 00640065 00640065 00640065 00630063 00630063 00630063
(14800)	00620062	00610061	00610061	00610063 00640063 00630063 00630063 00630063 00630063 00630063
(15200)	00630063	00620063	00530063	00630063 00630063 00630062 00610061 00610061 00630063 00630062
(15600)	00630064	00650066	00550065	00650063 00620063 00620064 00630063 00630063 00630064 00640062
(16000)	00620062	00640062	00530062	00630065 00630065 00630064 00630064 00630063 00630063 00630063
(16400)	00630063	00640065	00660066	00650066 00650066 00650065 00620062 00620062 00630064 00620062
(16800)	00630064	00640064	00540053	00630063 00630062 00620062 00620061 00630061 00630062 00640064
(17200)	00640063	00620062	00630062	00630064 00650064 00650063 00630062 00620062 00620062 00630062
(17600)	00620063	00630064	00530063	00640062 00620062 00620063 00630063 00630062 00630063 00630063
(18000)	00630062	00630063	00530063	00640064 00640064 00640063 00630063 00630062 00630062 00630063
(18400)	00640064	00640064	00640063	00630063 00630063 00630062 00620062 00620062 00630063 00630063
(18800)	00630064	00640064	00640064	00630063 00630063 00630062 00620062 00620062 00630063 00630063
(19200)	00640064	00630062	00630062	00630064 00630064 00630063 00630062 00620062 00620062 00640064
(19600)	00630062	00620064	00640064	00640064 00650064 00650063 00620063 00630063 00630064 00640064
(20000)	00630064	00640064	00530063	00630063 00630062 00620062 00620061 00630061 00620061 00650065
(20400)	00630062	00650069	00670065	00650065 00650065 00650064 00620062 00620062 00630064 00630063
(20800)	00630063	00640064	00630064	00630063 00630063 00630062 00620062 00620062 00630064 00640064
(21200)	00620063	00630063	00630064	00640064 00640064 00640064 00640064 00630063 00630063 00630063
(21600)	00640064	00650064	00650063	00650063 00650062 00640064 00640064 00630063 00630063 00630064
(22000)	00630065	00650064	00540063	00630063 00630063 00630062 00630062 00630063 00630063 00640064
(22400)	00640064	00640064	00530063	00630063 00630062 00630061 00610061 00610061 00630065 00640064
(22800)	00630062	00620062	00630063	00630063 00630063 00630062 00620062 00620062 00630063 00620062

FILE		INPUT RECS.	DATA RECORDS	MAX. SIZE	PERM ZERC B	READ ERROR SUMMARY	INPUT RETRIES
1	E4	8190	4 RECORDS	8150 BYTES	SHORT UNDEF.	#RECS.	TOTAL# C 0
F 3							
(3)	FFFD0012	43314C00	C02000000	00004633	00040000	034F0088	3B2A14F4 14EC0D35 00000100 4001001A
(40)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(80)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(120)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(160)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(280)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(360)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(400)	0017000F	0015000E	0016000F	0013000E	00160011	00050000	00000000 00000000 00000000
(440)	00000001	00110014	00020012	001100CE	0013000F	0015000D	0014000F 0012000C 0014000F 00150015
(480)	00000010	00000010	00000010	00000014	00000013	00000013	00000000 00000000 00000000
(520)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(560)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(600)	CC11000E	00130019	00150019	00130013	00190013	00150013	00130019 00130019 00000000 00000000
(640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(760)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(800)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(840)	0000000F	00140013	00100014	0000C00F	0019000E	00100011	00110013 00000000 00000000
(880)	0017000D	0013000D	00150021	00260024	00250029	00190012	0016000F 00150015 000B0017 0014000E
(920)	001FC010	001E0014	00050000	00000000	00000000	00000000	00000000 00000000 00000000
(960)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1000)	00000005	00100014	00150010	00140010	0012001A	000F0010	00160010 00100012 00100010
(1040)	00100010	001C001A	00CF0016	0016000E	00130015	0010000F	0016000C 00120016 00100008 00000000
(1080)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1120)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1160)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1200)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1240)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1280)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1320)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1360)	0013000C	0017000F	0013000F	00140012	001200CE	0016000F	0013000D 0013000B 000E000A 00080009
(1400)	00008007	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1440)	00000010	00140000F	0015000E	0015000F	0013000E	001A000F	000E0016 00100016 000F0012 000E0017
(1480)	000E0013	00100014	000E0015	00000000	00000000	00000000	00000000 00000000 00000000
(1520)	00000003	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1560)	00000003	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1600)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1640)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1680)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1720)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000
(1760)	00000000	00000000	00000000	00000000	00000000	00000000	00000000 00000000 00000000

DUMP OF TAPE DOUTA

D- 59748

INPUT TAPE DOUTA ON TUI
DATA INPUT HS NF E SR 1 1.1 SR 6 1.1 SR 6 LAST 1

FILE	1 RECORD	LEN	8180 BYTES
(0)	FFF0012	4DE13135	3013449 9004D48 00C40000 2105003C 4B2714B5 11930C13 00000100 4001001A
(40)	00000008	27120000	00000015 003B0004 00150050 27160014 0384C0E1 40FFF0FD 00000000 00000000
(80)	B8512BF4	40EAC46F	C0661471 3BBAE6D 40661471 40EAC46F 271F00BE 000A0000 00000003 42204433 00000000 00000000
(120)	412C4437	000C0000	00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
(160)	0CC00000	00000000	00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 0000001E
(200)	003F0003	44204433	00000000 00000000 00000001 00090006 41204436 00000000 00000000 00000000 00000000
(240)	45204433	00000000	00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
(280)	00000000	00000000	00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
(320)	00000000	00000000	00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
(360)	00000000	00000000	00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
(400)	00000000	27720007	00366013 00080014 00020000D 00502772 00070095 00130020 00340002 00000050 27720007
(440)	27720007	00580013	00100001 00020000D 00502772 00070095 00130020 00340002 00000050 27720007
(480)	0C940013	00240020	00020000D 00502772 00070095B 00130027 00150002 00000050 27720007 005C0013
(520)	0028003A	00020000D	00502772 0007009D 0013002A 00140002 00000050 27720007 009E0013 002D0020
(560)	00C20007	0052772	00130031 001A00050 00000050 27720007 00A00003 00350014 00020000D 00502772
(600)	0052772	000700A1	00130038 00350002 00000050 27720007 00A00014 00020000D 00502772 00700A5
(640)	000700A3	00140005	00030002 00000050 27720007 00A40014 00110022 00020000D 00502772 00700A7 00140015
(680)	0014000E	000F0002	00000050 27720007 00A60014 00110022 00020000D 00502772 00700A7 00140015
(720)	00CA0002	000C0050	00000050 27720007 00A80014 00180037 002000L 00502772 00700A9 0014001C 00210002
(760)	00000050	27720007	004A0014 001F0015 00020000D 00502772 0007009F 001700CAB 00140039 00000002 00000050
(800)	27720007	00AC0014	003A0034 0002000D 00502772 00C700AF CC150008 00110002 00000050 27720007 00B00015
(840)	00AE0015	00040009	0002000C 00502772 00C700AF CC150008 00110002 00000050 27720007 00B00018
(880)	003E0026	0002000D	00502772 000700B1 00000037 0034002 000E0050 27720007 00B0000C 003B0018
(920)	0002000E	00502772	000700B3 000E0004 00130002 000E0050 27720007 00B0000E 00090010 0002000E
(960)	00502772	000700B5	00E000D 000B0002 000E0004 001A0014 001F0015 0002000D 00502772 0070007 00B6000E 00130050 27720007
(1000)	0C0700E7	00CE0014	00366009 0002000C 00502772 00C700C7 00C8000E 0016002A 0002000E 00502772 00700E6D
(1040)	00DE0017	00130002	00040009 0002000D 00502772 00C700C7 00130050 0020000E 00502772 00700BF 000E001D
(1080)	0C120002	000E0050	0002000D 00502772 000700B1 000000E 0020002C 0002000E 00502772 00700C1 002C0002
(1120)	00CE0050	27720007	00C2003E 0029002D 0002000E 00130002 000E0050 27720007 00D0502772 000700C4 00084000E 00090010 0002000E
(1160)	27720007	00C6000E	002E00013 0002000E 00502772 0007009F 000700C8 000E0C34 00350002 00130050 27720007
(1200)	00CD000E	00370029	00502772 000700C3 00502772 000700C5 000F0002 00130050 27720007 00D80007 0004003A
(1240)	003B0012	00020013	00502772 000700C7 000F0002 00100002 00130050 27720007 00D80007 0004003A
(1280)	00020013	00502772	00700C9 000F0006 00380002 00130050 27720007 00DA000F 009000E 00020013
(1320)	005C2772	000700DB	000FC00C 001E0002 00130050 27720007 00D0502000E 00502772 000700DF
(1360)	000700DD	000F0011	002E0002 00130050 27720007 00D0E000F 0015003A 00020013 00502772 000700E1 00020021
(1400)	00CF001A	00220002	00130050 27720007 00E0000F 001E0012 00020013 00502772 000700E3 00F00026 00130050
(1440)	00270002	00130050	27720007 00E4000F 002A0021 00020013 00502772 000700E5 000F002E 000D0002 00130050
(1480)	00130050	27720007	00E6000F 00310013 00020013 00502772 000700E7 00F50034 00250002 00130050 27720007
(1520)	27720007	00E6000F	00380004 00200013 00502772 000700E9 00F003A 00390002 0130050 27720007 00E80010
(1560)	0CE800F	00130050	00200013 00502772 000700EC 00100002 00130050 27720007 00E80010 00070002
(1600)	00D010037	00020013	00502772 000700EC 00100002 00130050 27720007 00E80010 00070002
(1640)	00020013	00502772	000700EE 0010000C 00380002 00130050 27720007 00F00010 00100021 00020013
(1680)	00502772	000700F0	00100014 00130050 27720007 00F10010 00190005 00020013 00502772 000700F1
(1720)	0C700F2	001C001D	00330002 00130050 27720007 00F30010 00200024 0020013 00502772 000700F4
(1760)	00100024	00090002	00130050 27720007 00F50010 0027001A 00200013 00502772 000700F6 0010002A
(1800)	00310002	00130050	27720007 00F70010 002D0037 002D0037 00502772 00700F8 00100031 00070002
(1840)	00130050	27720007	00F90010 00350001 00200013 00502772 00700FCFA 00150021 00080002 00130050
(1880)	00502772	00070120	00020015 0025002B 00020002 00502772 00700FC 00150025 000AA0002 00130050 27720007
(1920)	00FD00T5	002C0022	00320013 00502772 000700FE 0015002F 002C0002 00130050 27720007 00F00015
(1960)	00340006	00020013	00502772 00070100 00150038 00050002 00130050 27720007 01010015 003B002E
(2000)	0020013	00502772	00160003 00220002 00130050 27720007 012C0000 00900359 00020014
(2040)	00502772	00070120	000270002 00140005 00270007 01300000 00050009 0020014 00502772
(2080)	00070133	0000000D	00140005 00140005 00140005 001370000 00050022 00130050 27720007 00070138
(2120)	00000010	001A0002	00140005 00140005 00140005 00139000 0011000A 00020014 00502772 007013B 00000012
(2160)	00300002	00140005	00140005 00140005 00140005 001200035 001200035 00502772 007013D 00000013
(2200)	00140005	27720007	01350000 001400013 00020014 00502772 0007013F 00000015 00200002 01400050
(2240)	27720007	01420000	0016002D 00020014 00502772 00070145 00000018 00502772 007013B 00000012
(2280)	00180039	0020014	00502772 00070145 00000000 00502772 00070145 003BC002 0140050 27720007

FILE		INPUT RECORDS		DATA RECORDS		MAX. SIZE		READ ERRORS		ERR SUMMARY		INPUT RETRIES	
	RECS.	REC#	INPUT	REC#	DATA	REC#	PERM. ZERO	REC#	SHORT	REC#	UNDEF.	REC#	RETRIES.
(7600)	27720007	03120002	00640037	00020018	00000036	00020018	00502772	00070313	00502772	00020005	00260050	001B0050	001B0050
(7640)	27720007	03120002	00640037	00020018	00502772	00070315	0020017	00130002	00130002	00020005	001B0050	27720007	03160002
(7680)	03140002	0012002C	0032001B	0032001B	0032001B	0032001B	0070317	0020018	002E0002	001B0050	27720007	031A0002	001F001F
(7720)	CC1500CC	00020018	0032001B	0032001B	0032001B	0032001B	0020023	000C0002	001B0050	27720007	031C0002	002E0030	0002001B
(7760)	0502001B	00502772	00070319	00020018	00502772	00070317	0020018	002E0002	001B0050	27720007	031A0002	0026002C	0002001B
(7800)	00502772	0007031B	00320024	00380002	00320024	00380002	0020023	000C0002	001B0050	27720007	031C0002	002E0030	0002001B
(7840)	0007031C	00020032	00180050	00180050	00180050	00180050	0020023	000C0002	001B0050	27720007	031C0002	002E0030	0002001B
(7880)	00060002	00180050	00180050	00180050	00180050	00180050	003A0006	003A0006	003A0006	003A0006	003A0006	00502772	00070317
(7920)	00010002	001B0050	27720007	0322000C	00020033	00020018	00020018	00060032	0002001B	00502772	00070323	00020009	002F0002
(7960)	001B0050	27720007	0324000C	00020033	00020018	00020018	00020018	00060032	0002001B	00502772	00070325	00020011	001B0050
(8000)	27720007	0326000C	00130017	00020018	00502772	00070327	00020018	00020003	000C0016	00270002	001B0050	27720007	032A000C
(8040)	0328000C	001A002B	002001B	00502772	00070329	00020018	00020018	00060032	0002001E	001B0050	27720007	032A000C	00290027
(8080)	0021003G	0002001B	00502772	00070328	00020018	00502772	00070325	00034001E	001B0050	27720007	032C000C	00290027	00320028
(8120)	0002001B	00502772	0007032D	0002002E	001C0002	001C0002	001B0050	27720007	032E000C	00320028	00320028	00320028	00320028
(8160)	005C2772	0007032F	003CCCC35	002D0002	001B0050	001B0050	001B0050	002D0002	001B0050	002D0002	00320028	00320028	00320028

FILE INPUT DATA RECORDS MAX. SIZE READ ERRORS SUMMARY INPUT RETRIES
RECS. INPUT REC# REC# LENGTH 8180 BYTES PERM. ZERO SHORT UNDEF. #RECS. TOTAL # RETRIES.

FILE	E RECORD	REC#	REC#	LENGTH	8180 BYTES	PERM. ZERO	REC#	REC#	REC#	REC#	REC#	REC#	REC#
(0)	FFFD0012	4D513135	30353239	39394D48	00040000	2A9500E4	7B64146A	11AE0E27	000000100	4001011A	00000000	002F0002	002F0002
(40)	00000008	27120000	003003B	00160005	00160005	27160014	038400E1	40FFFDFD	00000000	00000000	00000000	00090003	00090003
(80)	BBS12BE4	40EAC46F	00661471	3BEAAE6D	40661471	4CEAC4EF	271FCCE	0CA0A0C0	00000000	00000000	00000000	00000000	00000000
(120)	41204433	00000000	00000000	00000000	00000000	00000000	43204433	00000000	00000000	00000000	00000000	00000000	00000000
(160)	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
(200)	0C3F0003	442C4433	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	04495645	2054494D
(240)	45254433	00000000	00000000	00000001	00000001	00000006	41204436	00000000	00000000	00000000	00000000	00000000	00000000
(280)	0000000A	00000006	42204436	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00100006	43204436	00000000
(320)	00000000	00000000	00000000	00000000	00000000	00000000	003F0006	44204436	00000000	00000000	00000000	00000000	00000000
(360)	00000000	00000000	00000040	00400006	4495645	2054494D	4E204436	00000000	00000000	00000000	00000000	00000000	00000000
(400)	00000000	27720007	05000012	00180014	0003000E	0003000E	00502772	000705DD	0012001E	00120003	00000003	00000050	00000050
(440)	27720007	05DE0012	0003000E	0030000E	00502772	000705DF	00120024	00390003	00000000	27720007	05FA0014	00000000	00000000
(480)	CSE0012	0028000C	0030003E	00502772	000705E3	00120031	00120029	00370003	00000003	00000003	00000003	00000003	00000003
(520)	C2C000D	0003000E	00502772	000705E8	00120039	00330003	0000E050	27720007	005E90013	0001003A	0003000E	0003000E	0003000E
(560)	0093030CE	00502772	000705EA	00130005	00170003	0000E050	27720007	005EB0013	0008002E	0003000E	000502772	000502772	000502772
(600)	00502772	000705EA	00130005	00140012	00180014	0003000E	005ED0013	0000E03B	0003000E	0003000E	000502772	000705EE	000705EE
(640)	000705EC	0013000C	00160003	0000E050	27720007	000705F9	0016001A	0003000E	0003000E	0003000E	000502772	001300018	00130003
(680)	00130012	00150003	0003000E	00502772	000705FB	00140004	003B0003	00030003	0000E050	27720007	005FC0014	000705022	000705022
(720)	00290003	000E0050	27720007	05F30013	00250029	0003000E	00502772	000705F4	0013002A	00050003	0000E050	27720007	0000E050
(760)	000E0050	27720007	05F30017	00250029	0003000E	00502772	000705F7	00130032	00370003	0000E050	27720007	0000E050	0000E050
(800)	27720007	05F500C13	002E0035	0003000E	00502772	000705F9	00130039	00380003	0000E050	27720007	00502772	0000E050	0000E050
(840)	C5F80013	00360021	0003000E	00502772	000705FB	00140004	003B0003	00030003	0000E050	27720007	00502772	0000E050	0000E050
(880)	00100010	0003000E	00502772	000705FB	00140004	002F0026	000360003	000360003	0000E050	27720007	00502772	0000E050	0000E050
(920)	0003000E	00502772	000705FD	00140005	000360029	000360003	000502772	0007060C	0014003A	000A0003	0000E050	27720007	0000E050
(960)	00502772	000705FF	00140012	00180003	000E0050	27720007	0007060C	00160010	0003000E	0003000E	0003000E	0003000E	0003000E
(1000)	00070601	0014001B	00090003	0000E050	27720007	06020014	001F001A	0003000E	0003000E	0003000E	0003000E	0003000E	0003000E
(1040)	00140024	000F0003	0003000E	00502772	00070612	00170018	00340003	00110050	27720007	06130017	00200003	00200003	00200003
(1080)	00070603	0003000E	00502772	00070614	00170024	00360003	000502772	0007060C	0014003A	000A0003	0000E050	27720007	0000E050
(1120)	00070600	27720007	06080014	00180003	000E0050	27720007	06170007	00300014	00030003	00030003	00030003	00030003	00030003
(1160)	00502772	00070616	00170024	00180003	00110050	27720007	06190017	00370017	00030003	00030003	00030003	00030003	00030003
(1200)	060F0017	000F0031	00030011	00502772	00070612	00080000	0008002E	00030012	000502772	00070612	00070612	00070612	00070612
(1240)	001E001C	00030011	00502772	00070612	00170018	00340003	00110050	27720007	06150017	00290002	00300011	00200003	00200003
(1280)	00120050	00030011	00502772	00070614	00170024	00360003	000502772	0007060C	0014003A	000A0003	00120050	27720007	00020003
(1320)	00532772	00070616	00170024	00180003	00110050	27720007	06170017	00300014	00030003	00030003	00030003	00030003	00030003
(1360)	00070618	00170034	00160003	00180003	00110050	27720007	06190017	00370017	00030003	00030003	00030003	00030003	00030003
(1400)	0017003A	002C0003	00110030	00502772	00070617	061B00C0	0001001A	00030012	000502772	00070617	00070617	00070617	00070617
(1440)	000A0003	00120050	27720007	061F0000	0011001C	00030012	000502772	00070620	00070620	00070620	002A0003	002A0003	002A0003
(1480)	00120050	27720007	061F0000	0011001C	00030012	000502772	00070622	00070622	00070622	00070622	002A0003	002A0003	002A0003
(1520)	00532772	00070607	06210000	00140005	00030012	000502772	00070624	00070624	00070624	00070624	002A0003	002A0003	002A0003
(1560)	00623000C	00220002	000502772	00070612	000502772	00070624	00070624	00070624	00070624	00070624	002A0003	002A0003	002A0003
(1600)	002B002D	00030012	00502772	00070626	000502772	00070626	00010003	00120050	27720007	06270007	00502772	00502772	00502772
(1640)	CCC30012	00502772	0070628	000300035	00320003	00120050	27720007	06290000	00290000	00290000	00290000	0030011	0030011
(1680)	005C2772	0007062A	00310000	00030003	00070003	00120050	27720007	06280001	00280001	00280001	00280001	0030012	0030012
(1720)	0007062C	00010006	00360003	00120050	27720007	062D0001	000A0027	00502772	005				

D-59749
21978 7/2/78

INPUT TAPE DOLIB ON TUO
DATA INPUT H2 NF E SR 1 1 1 SR 3 1 1 SR 6 LAST 1

FILE	1 RECORD	FILE 2 LENGTH	34 81920 BYTES	4
(0)	FFF00012	4D513238	30303339	393394D48
(- 40)	0C0000008	27120000	002E0025	00070006
(- 80)	BB5126E4	40EAC46F	C0661471	3BBAEE6D
(- 120)	412C4432	00000000	00000000	40661471
(- 160)	0C0000006	00000000	00000000	40EAC46F
(- 200)	003E0003	44204433	00000000	2712008E
(- 240)	4E204433	00000000	00000000	40661471
(- 280)	0000000A	09CE0006	42204436	40EAC46F
(- 320)	00000000	00000000	00000000	40661471
(- 360)	00000000	00000000	00000000	40661471
(- 400)	00000000	00000000	00000000	40661471
(- 440)	27720007	0E150017	00000018	0005000B
(- 480)	0E170017	001400CB	0050003B	00502772
(- 520)	00130004	0005000B	00502772	00070E18
(- 560)	00050008	00502772	00070E1D	0017001E
(- 600)	00502772	00070E20	00170027	00230005
(- 640)	0C070E24	00170032	00170032	0008B005
(- 680)	0C170038	002D0005	0008B005	02770007
(- 720)	0C2400C5	009C0050	27720007	0E250000
(- 760)	0C000050	27720007	0E250000	0005000C
(- 800)	27720007	0E300000	001E001D	00502772
(- 840)	0E320000	002E0034	0005000C	0070E33
(- 880)	C2C0034	0005000C	006502772	0070E35
(- 920)	0005000C	00502772	0070E38	00000036
(- 960)	27720007	0E470008	000B001F	00502772
(- 1000)	0E490008	00140000	00502772	002E0005
(- 1040)	0C1D0020	0005000C	00502772	0070E4C
(- 1080)	0005000C	00502772	00670E4E	0008002A
(- 1120)	00502772	00070E50	00380031	000A0005
(- 1160)	0070E52	00080038	00190005	000C0050
(- 1200)	0C090003	00170005	00050050	27720007
(- 1240)	0C3300C5	000C0050	27720007	0E5C0010
(- 1280)	000C0050	27720007	0E5C0010	0008002F
(- 1320)	00502772	00070E52	00190005	000C0050
(- 1360)	0070E52	00080038	00190005	27720007
(- 1400)	0C090003	00170005	00050050	0E550009
(- 1440)	0C3300C5	000C0050	27720007	0E5C0010
(- 1480)	000C0050	27720007	0E5E0010	00120000
(- 1520)	27720007	0E600010	00190010	0005000C
(- 1560)	0C6E20010	001F0029	0005000C	00502772
(- 1600)	0C2E0026	0005000C	00670E65	00100030
(- 1640)	00502772	0070E67	00100030	00050005
(- 1680)	27720007	0E750015	00220030	00100030
(- 1720)	0E770015	0029003B	00010005	00502772
(- 1760)	0011000F	00000005	00000005	27720007
(- 1800)	00290005	000C0050	27720007	0E6E0011
(- 1840)	0C000050	27720007	0E700011	00180036
(- 1880)	00502772	0070E7C	00160001	00350001
(- 1920)	00502772	0070E7C	00110001	00502772
(- 1960)	00320007	00010007	00502772	00150036
(- 2000)	00010007	00502772	0070E7C	00350001
(- 2040)	00502772	0070E7C	00110001	0070E50
(- 2080)	0070E85	0016000D	03500001	27720007
(- 2120)	0C160014	001B0001	00070050	27720007
(- 2160)	0C3E0001	00070050	27720007	0E80016
(- 2200)	0C070050	27720007	0E80016	002C0006
(- 2240)	27720007	0E8E0016	002D00017	00502772
(- 2280)	0E9E0016	00330031	00100001	CC160036

FILE		INPUT	DATA RECORDS	MAX.	READ ERROR SUMMARY	INPUT RETRIES					
	RECS.	INPUT	RECS.	SIZE	PERM. ZERO B.	SHORT UNDEF.	RECS.	TOTAL #			
1	532	538	419	9999H	0	0	0	0			
(	7600)	000E0C053	27720007	00060004	0004000E	0004000E	00072772	001400C9	00290004	000E0050	
(	7640)	27720007	0B6C0014	00000028	0004000E	000502772	00070B6D	0014000F	00360004	000E0050	27720007
(	7680)	C66E0014	00130017	0004000E	00502772	00070B6F	0014001E	00370004	000E0050	00230001	
(	7720)	0C1A0008	0004000E	00502772	00070B71	0014001E	00370004	000E0050	00230001		
(	7760)	0004000E	00502772	00070B73	00140027	00130004	00050050	27720007	0B740014	00280025	0004000E
(	7800)	C0502772	00070376	0014002F	00260004	00050050	27720007	0B770014	0033000C	0004000E	00502772
(	7840)	C0502778	00140036	00250004	00050050	27720007	0B790014	0039037	0004000E	00502772	0070B7A
(	7880)	00150001	00040004	00050050	27720007	0B780015	00040010	0004000E	00502772	0070B7C	00150007
(	7920)	0030004	000E0050	27720007	0B7D0015	00040005	00040005	000502772	00070B7E	0015000E	00100004
(	7960)	00CE0050	27720007	0B7FC015	00100029	0004000E	00502772	00070B80	00150014	00350004	000E0050
(	8000)	27720007	0B810015	00190001A	0004000E	00502772	00070B82	0015001D	001F0004	000F0050	27720007
(	8040)	0E830015	C02200017	00040005	00502772	00070B84	00150025	002E0004	000E0050	27720007	0B850015
(	8080)	00250039	00040005E	00502772	00070B86	00120002	00502772	00070B88	00120009	002A0004	00120050
(	8120)	00040012	00502772	00070B88	00120009	002A0004	00120050	27720007	0B850012	000C002E	00040012
(	8160)	00502772	00070B8A	00120010	00030004	00120050	00502772	0B850012	0002000E	00040012	00120050

LUNS OF TAPE DOUTC

INPUT TAPE DOUTC ON TUI
DATA INPUT H9 NF 6 FL 11 0 SR 1 1 SR 6 LAST 1

FILE 1 RECORD M Q 57 00 69 8180 BYTES

FILE	1 RECORD	M Q	57	00	69	8180 BYTES	LAST 1
(0)	FFF0012	4D513537	30703675	36354D48	00C40000	1FCC00FA	77FD146A
(49)	00000008	27120000	003B0030	003B0006	001A050	27160014	038400E1
(80)	BB512BE4	40EAC46F	C0661471	3BBAE6D	40661471	40EAC46F	271F008E
(120)	412C4433	000C0000	000C0000	000C0000	0000000A	00000003	42204433
(160)	000C0003	000C0000	000C0000	000C0003	43204433	00000000	00000000
(200)	003F0003	44204433	00000000	00000001	00090006	41204436	00000000
(240)	45204433	00000000	00000000	00000000	00000000	00000000	00000000
(280)	000C000A	00CE0006	42204436	00000000	00000000	00000000	00000000
(320)	00000000	00000000	00000000	00000000	0000001E	003F0006	44204436
(360)	00000000	00000040	4C495645	2054494D	45204436	00000000	27380004
(400)	00000000	00000036	00000006	00060001	00502772	00071645	00320006
(440)	27720007	16470003	0027001C	00060001	00502772	00071648	00120006
(480)	16490003	0025000C	00360091	00502772	0007164A	0003002F	00130006
(520)	0033000E	00060001	00502772	0007164C	00030036	00150006	00010050
(560)	00060001	00502772	00071661	00020006	0020006	00010050	27720007
(600)	00502772	00071663	00040008	000250006	000210050	27720007	16580003
(640)	0C07166E	0004000F	002A0006	00010050	27720007	166F0004	0014000A
(680)	0C040018	00220006	00010050	27720007	16710004	001C0017	00060001
(720)	0C340006	00010050	27720007	16730004	0023001D	0C060001	00502772
(760)	0C010050	27720007	16750004	00240015	00600001	00502772	00071676
(800)	27720007	1677000A	00080029	00060001	00502772	00071678	000A000B
(840)	1679000A	000E0037	00060001	00502772	00071682	000A0014	00010050
(880)	0C16000F	00060001	00502772	00071684	000A0019	0C380006	00010050
(920)	00060001	00502772	00071686	000A0020	000F0006	00010050	27720007
(960)	0C502772	00071688	00040006	00010050	27720007	1689000A	002B0004
(1000)	0CC7168A	300A002D	00240006	0010050	27720007	168B0004	00310025
(1040)	00040036	00080006	00010050	27720007	168D000A	0039001C	00060001
(1080)	00020006	00010050	27720007	1694000B	00050023	00060001	00502772
(1120)	00010050	27720007	1696000B	000B0021	00060001	005C02772	0007169C
(1160)	27720007	169D000B	00130009	00060001	00502772	0007169E	000B0017
(1200)	169F000B	00140001	00060001	00502772	0007169E	000B0017	002E0006
(1240)	00210030	00100001	00502772	000716A2	000B0023	00310006	00010050
(1280)	00060001	00502772	000716A4	000B002A	002B0006	00010050	27720007
(1320)	00502772	000716A6	000B0031	002B0006	0010050	27720007	16AD0013
(1360)	000716A5	00130006	00360002	000E0050	27720007	16AF0013	000A0022
(1400)	0013000C	00230002	000E0050	27720007	16B10013	0010027	0002000E
(1440)	00380002	000E0050	27720007	16B30013	00150010	002000E	00502772
(1480)	000E0050	27720007	16B50013	001B0008	0002000E	00502772	000716B6
(1520)	27720007	16B80013	00220011	0002000E	00502772	000716BC	00130025
(1560)	16E00013	00290025	0052000C	000502772	000716BE	0C13002C	0028C002
(1600)	0C300021	00020000	005C02772	000716C0	00130033	001C0002	000502772
(1640)	0002000E	00502772	000716C3	00130039	00290003	00050050	27720007
(1680)	0C5C2772	000716D3	00140005	003A0002	000E0050	27720007	16D40014
(1720)	CCC716C8	0014000A	00290002	00050050	27720007	16DC0017	002C001E
(1760)	0017002F	001D0002	003E0050	27720007	16DE0017	00330006	0002000E
(1800)	00180002	000E0050	27720007	16E00017	0038001B	0002000E	00502772
(1840)	00502772	000716FE	00030001	0003001E	0050200F	000502772	000716E3
(1880)	00071700	16E40000	0009000C	00020000	00502772	000716E5	00330002
(1920)	16EED000	0011000C	0032000F	000502772	000716EE	00080002	00380002
(1960)	0017001E	0002000F	00502772	000716F0	0000001A	00110002	000F0050
(2000)	0002000F	00502772	000716F2	00000021	000C0002	000F0050	27720007
(2040)	00502772	000716FE	00030002	00020002	000F0050	27720007	16FC0000
(2080)	00071700	16E20007	00090002	00020000	00502772	00071701	0002000F
(2120)	00060034	001B0002	000F0050	27720007	17030000	00310017	00502772
(2160)	001A0002	000F0050	27720007	17050001	003003B	002000F	00160002
(2200)	CCCFC05C	27720007	17080031	000C0030	00502772	00071709	0010010
(2240)	27720007	170A0001	0014001C	0002000F	00502772	0007170B	00010018
(2280)	171F0037	000C0011	002300CF	00502772	00071720	00100111	00100CC02

D - 59750
8/14/78 - 1779

JUMP OFF TAPE SINC

INPUT TAPE DINC ON TWO

PG NE 4 SR 4 1 1

FILE INPUT DATA RECORDS

RECS. 512 INPUT

MAX. SIZE 8180

DATA RECORDS

PERM. LENGTH

MAX. LENGTH

8180 BYTES

READ ERROR SUMMARY

PERM. ZERO'S SHORT.

UNDEF. #RECS. #RETRIES

C 0 C 0

G 0 G 0

TOTAL# 0

INPUT RETRIES

0

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READ ERROR SUMMARY           INPUT RETRIES
ERRM  ZERO  B   SHORT  UNDEF. #RECS. TOTAL#
0     0      0      0       0       0       0

```

FILE	INPUT	SEGS.	DATA RECORDS	MAX.	SIZE
1	18	18	18	18	3190